Appendix F – Ecology Assessment Report: Survey 3 and 4

Lansdown Eco-Industrial Precinct, Woodstock

Ecological Assessment Report: Precinct Road Alignments

Job Number: VS0366

7/11/2022

Evolve Environmental Solutions Pty. Ltd.

Document Control

Document Name: *Second Ecological Assessment Report: Precinct Road Alignments – Lansdown Eco-Industrial Precinct, Woodstock*

Document Issue

Issue	Date	Prepared By	Checked By
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Issue B	7.11.2022	Angela Little	Adam Hutchinson

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1 Introduction & Purpose

Evolve Environmental Solutions (**Evolve**) was contracted by Calibre Professional Services Pty Ltd (**Calibre**) to conduct an Ecological Survey and Report on the Lansdown Eco-industrial Precinct roadway infrastructure alignment. The Ecological surveys contained within this report represent works conducted on the alignment area between 12th September and 14th October 2022.

Previous vegetation and waterway assessments of project road alignments were conducted between 28th March to 1st April and reported in *Ecological Assessment Report – Lansdown Eco-Industrial Precinct, Woodstock* issued on 29th April 2022. Previous ecological survey works for the project conducted by Evolve between 22nd and 27th May, inclusive of waterway, vegetation and fauna surveys relevant to the road alignment area were reported in *Ecological Assessment Report: Week Two – Lansdown Eco-Industrial Precinct, Woodstock* Issued on 6th October 2022.

The aim of the September-October road alignment surveys, which are the subject of this report, was to determine the presence or absence of threatened flora and fauna species, habitat values and breeding places, and potential impact on fish movement at waterway crossings.

Findings of the survey are to support the following relevant approvals/permits as applicable:

- Vegetation clearing permit under the *Vegetation Management Act 1999*;
- Operational works for taking or interfering with water under the *Water Act 2000* and the *Planning Act 2016*;
- Riverine Protection Permit under the *Water Act 2000*;
- Operational work in a wetland protected area under the *Environmental Protection Act 1994* and *Planning Regulation 2017*;
- Operational Works development approvals for waterway barrier works under the *Fisheries Act 1994*;
- Should Protected Plants be identified during the survey, a Protected Plants Clearing Application under the *Nature Conservation Act 1992*; and
- Self-assessment of activities and impacts to Matters of National Environmental Significance (MNES) to confirm if a referral under the *Environment Protection and Biodiversity Conservation Act 1999* is required.

Survey works were undertaken in accordance with relevant Department of Environment and Science or Department of Agriculture and Fisheries methodologies and guidelines as outlined in **Section 3: Ecological Methodology,** with the aim to:

- Ground-truth regional ecosystem mapping;
- Undertake habitat assessments;
- Survey for threatened fauna; and
- Complete waterway assessments suitable for Operational Works development approvals for waterway barrier works.

2 Site Context

The Lansdown Eco-Industrial Precinct Project is located approximately 38km south of Townsville along the western side of the Flinders Highway. The precinct road alignments traverse Ghost Gum Road, Bidwilli Road, Manton Quarry Road and associated easements (see **Figure 1**)

Legend

LEIP Enabling Infrastructure R4

Roads subject to survey within this report

N

0 0.5 1 Kilometers

Figure 1 Site Context Roads Lansdown A
27/10/2022

Figure 1: Site Context

EVOLVE environmental solutions

Client: CDM Smith Australia Pty Ltd
Address: Lansdown Eco-Industrial Precinct

3 Ecological Methodology

3.1 Survey Timing

Motion sensor cameras were deployed for 3-4 night periods during on-site survey works. Fauna observations, and waterway and vegetation assessments, additional to those previously conducted between the 28th March and 1st April and on Thursday 26th May, were conducted over the entirety of the survey periods 12th September to 16th September and 10th October to 14th October.

Weather conditions for the assessment dates are provided below in **Table 1**.

Table 1: Weather conditions during site surveys (Source: www.bom.gov.au)

Date	Day	Min Temp (°C)	Max Temp (°C)	Relative Humidity (9am)	Wind speed (9am)	Rainfall (mm)
12/09/2022	Monday	17.9	28.2	69%	6	0
13/09/2022	Tuesday	17.7	29.1	82%	6	0
14/09/2022	Wednesday	18.0	27.2	71%	6	0
15/09/2022	Thursday	16.6	27.4	64%	9	0
16/09/2022	Friday	20.5	29.5	60%	13	0
10/10/2022	Monday	20.9	29.4	75%	9	1
11/10/2022	Tuesday	21.1	30.4	67%	15	0
12/10/2022	Wednesday	20.7	29.4	65%	9	0
13/10/2022	Thursday	21.2	28.5	63%	6	0
14/10/2022	Friday	20.0	30.2	73%	2	0

Climatic records are drawn from the closest BOM station to the survey area, located in Mount Stuart (Station 032195).

3.2 Survey Equipment Specifications

Survey equipment specifications are provided below in **Table 2**.

Table 2: Survey equipment specifications for the devices utilised in-field.

Device Type	Unit Type	Unit Specifications
GPS	Arrow 100 Submeter GNSS Receiver	• Multi-constellation GNSS receiver that utilises differential corrections to achieve sub meter accuracy.
Camera trap	BlazeVideo No Glow Game Field Cameras	• Trigger distance up to 23m when at temperatures below 25°C, full field of view trigger distance at temperatures between 25oC and 60oC. • 70°PIR sensor detect wide and night vision up to 23m • Trigger time in 0.3 second
Audiomoth	Audiomoth 1.2.0	• 6.0 kHz minimum recording frequency • Recording period from 1800 to 0630 • Cyclic sampling of 2min sleep, 2 min recording • Using Firmware version 1.8.1

3.3 Floral Assessment Methodologies

Floral assessment methodologies were carried out as per guidelines published in *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland.* Version 5.1. with the following notable deviation: Queensland Herbarium Monitoring site tags or other permanent site tags were not placed at sampling locations. See **Plan 1A and 1B** for the location of these assessments.

3.3.1 BioCondition Assessments

All BioConditon assessments were conducted in accordance with 'A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual Queensland Herbarium, Science Delivery, Version 2.2 February, 2015'. Twelve (12) BioCondition assessments were conducted across the site.

3.3.2 Quaternary Vegetation Surveys

Quaternary Vegetation surveys are conducted as a point assessment:

- The survey point is recorded as a GPS coordinate;
- All species present at the sample point are recorded for each ecological layer;
- Dominant species and the height of the ecologically dominant layer are recorded; and
- Photos are taken from the survey point facing in each of the four cardinal directions; North, South, East and West.

Forty-two (42) quaternary surveys were conducted on site where full biocondition surveys were not considered necessary.

3.4 Fauna Assessment Methodologies

Fauna assessments have been carried out as per survey guidelines published in *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland,* Eyre et. al. (2018) and *Significant impact guidelines for the endangered black-throated finch (southern) (Poephila cincta cincta)* (2009). Refer **Plan 2** for locations of these surveys.

3.4.1 Camera Trapping

A total of twenty-two (22) motion sensor cameras were deployed for four (4) nights during either the September or October survey weeks (see **Table 1** for survey timing). The following methodology was employed during the camera trapping surveys:

- Cameras were installed in key locations on site;
- Cameras securely attached 10 – 50 cm from the ground on a tree or post;
- Cameras were not baited; and
- Cameras were set on the burst function of 3 photos per trigger.

3.4.2 Scat and Sign Search

These searches were conducted incidentally to coincide with systematic surveys and other on-site activities.

- Traces were documented with use of a camera for later confirmation of ID.
- Samples were not removed from site.

3.4.3 Spotlighting

3.4.3.1 Arboreal Mammal Spotlighting

Spotlighting surveys are conducted within the 100 x 100 m generic survey site for 30-person minutes by two ecologists.

- Spotlighting surveys were conducted on-foot;
- Tree canopies were inspected for arboreal mammals and perching birds;
- Binoculars were utilised to assist with species identification; and
- Each observer utilised a 30W hand-held spotlight.

3.5 Waterway Assessment

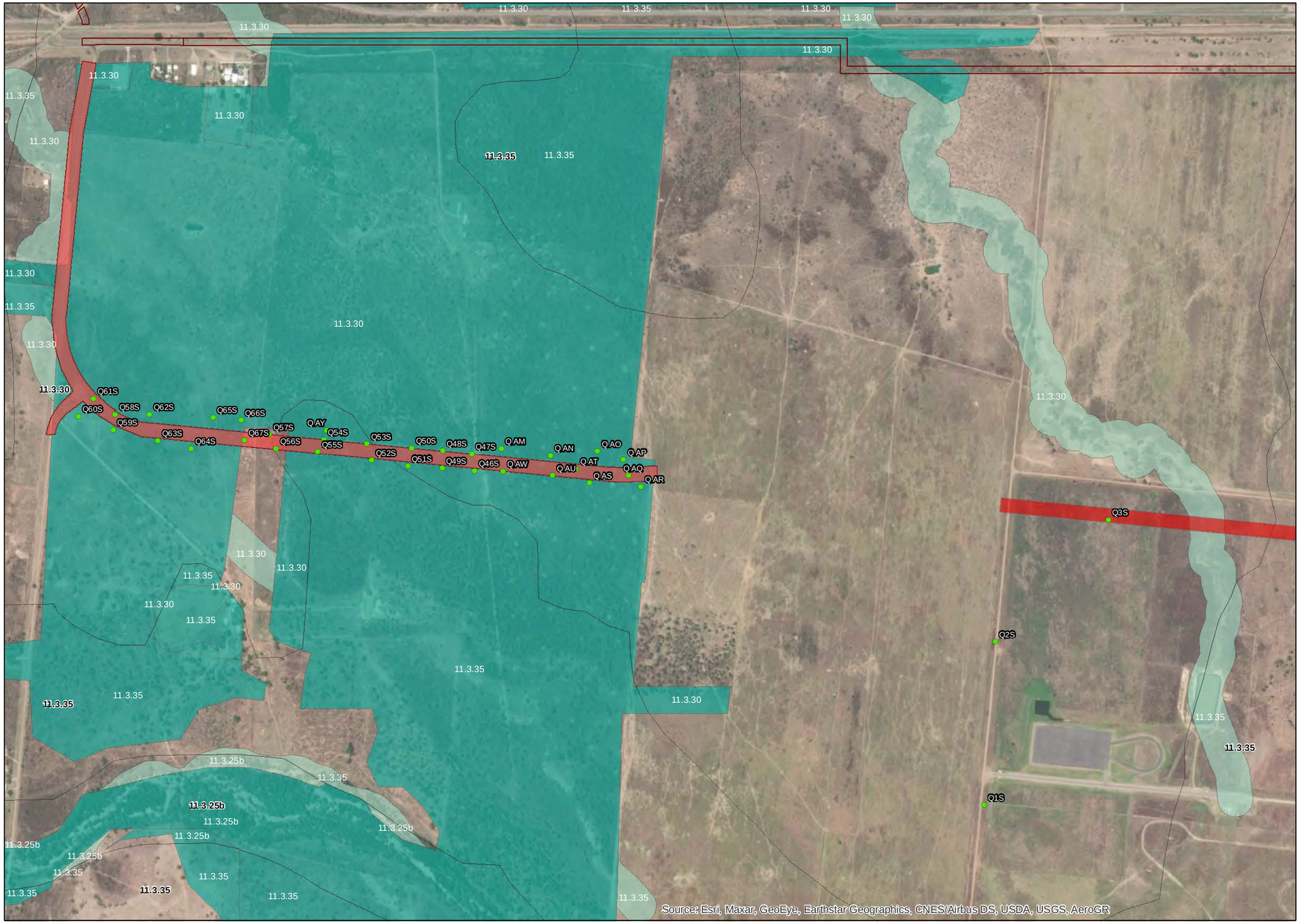
Waterways and drainage features were walked and captured by GPS. Photo points and aquatic features were noted at certain points along and near the crossing points, and additional crossing sections were noted that were not mapped as fisheries waterways but still would meet the definition of a waterway defined by the Department of Agriculture and Fisheries (DAF) as exhibiting at-least one of the following attributes:

1. *Defined bed and banks*
   The bed and banks need to be continuous upstream and downstream of the site rather than isolated and broken sections of a depression.
2. *An extended, if non-permanent, period of flow*
   Flow must continue beyond the duration of a rain event and have some reliability attached to rainfall. There is a need to distinguish between channels that funnel immediate localised rainfall; and waterways where flow has arisen from an upstream catchment.
3. *Flow adequacy*
   The flow needs to be sufficient to sustain basic ecological processes and habitats, and to maintain biodiversity within or across the feature. The adequacy of the flow depends on the ecological function of the channel e.g. waterways that connect to fish habitat like a wetland or waterhole may only need infrequent and short-duration flows to provide connectivity for fish.
4. *Fish habitat at, or upstream of, the site*
   Most instream features provide habitat for fish under adequate flow conditions or, in the case of pools, during dry periods. Therefore, it is important to have some knowledge of the fish species for the site and their habitat use, particularly in headwater streams. Periodic connectivity to upstream and off stream fish habitat are also considered fish habitat.

Ten (10) waterways were assessed within or adjoining the roadway alignment during the survey period. These were done to supplement previous waterway assessments completed for the 28th March to 1st April survey and 22nd to 27th May survey, and obtain additional waterway data for new proposed road infrastructure.

Refer to **Plan 3** for locations of these assessments, and **Plan 3B and 3C** for photos at these locations.

Plan 1A: Vegetation Assessments



Legend

- Vegetation Assessment Points
- Roads subject to survey
- LEIP Enabling Infrastructure R4
- Pre-clear vegetation mapping

VMA STATUS

- hvr_end
- hvr_leastc
- hvr_oc
- rem_end
- rem_leastc
- rem_oc

N

0 0.05 0.1 0.2 0.3 0.4 Kilometers

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

EVOLVE environmental solutions

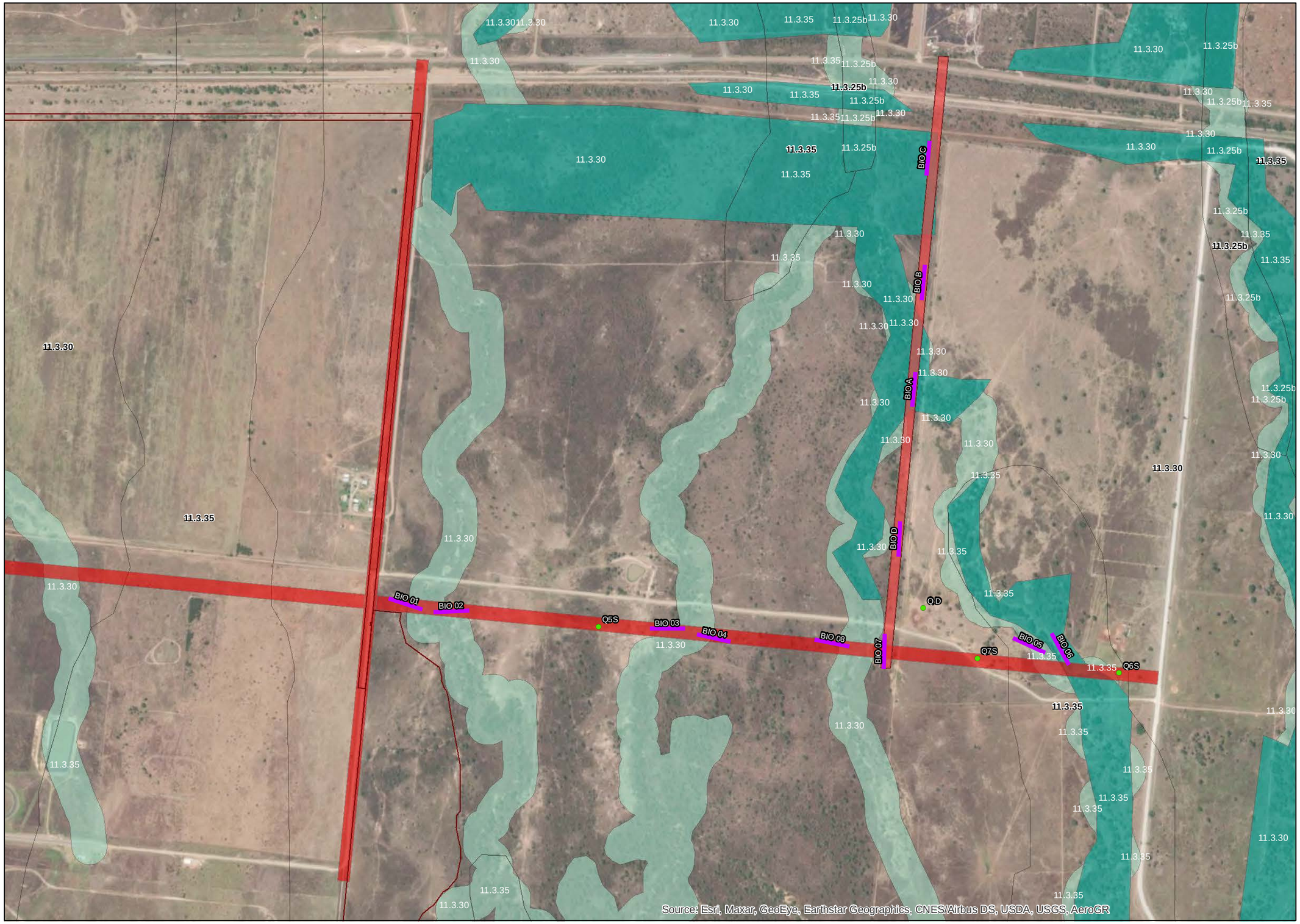
Issue	Date	Description	Drawn	Checked
A	7/11/2022	Preliminary	AL	AH

Lansdown Eco-Industrial Precinct

Date: 7/11/2022

Plan 1 Vegetation Assessments Road Lansdown A

Plan 1B: Vegetation Assessments



Legend

- Vegetation Assessment Points
- BioCondition Transects
- Roads subject to survey
- LEIP Enabling Infrastructure R4
- Pre-clear vegetation mapping

VMA STATUS

- hvr_end
- hvr_leastc
- hvr_oc
- rem_end
- rem_leastc
- rem_oc

N

0 0.050.1 0.2 0.3 0.4 Kilometers

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

EVOLVE environmental solutions

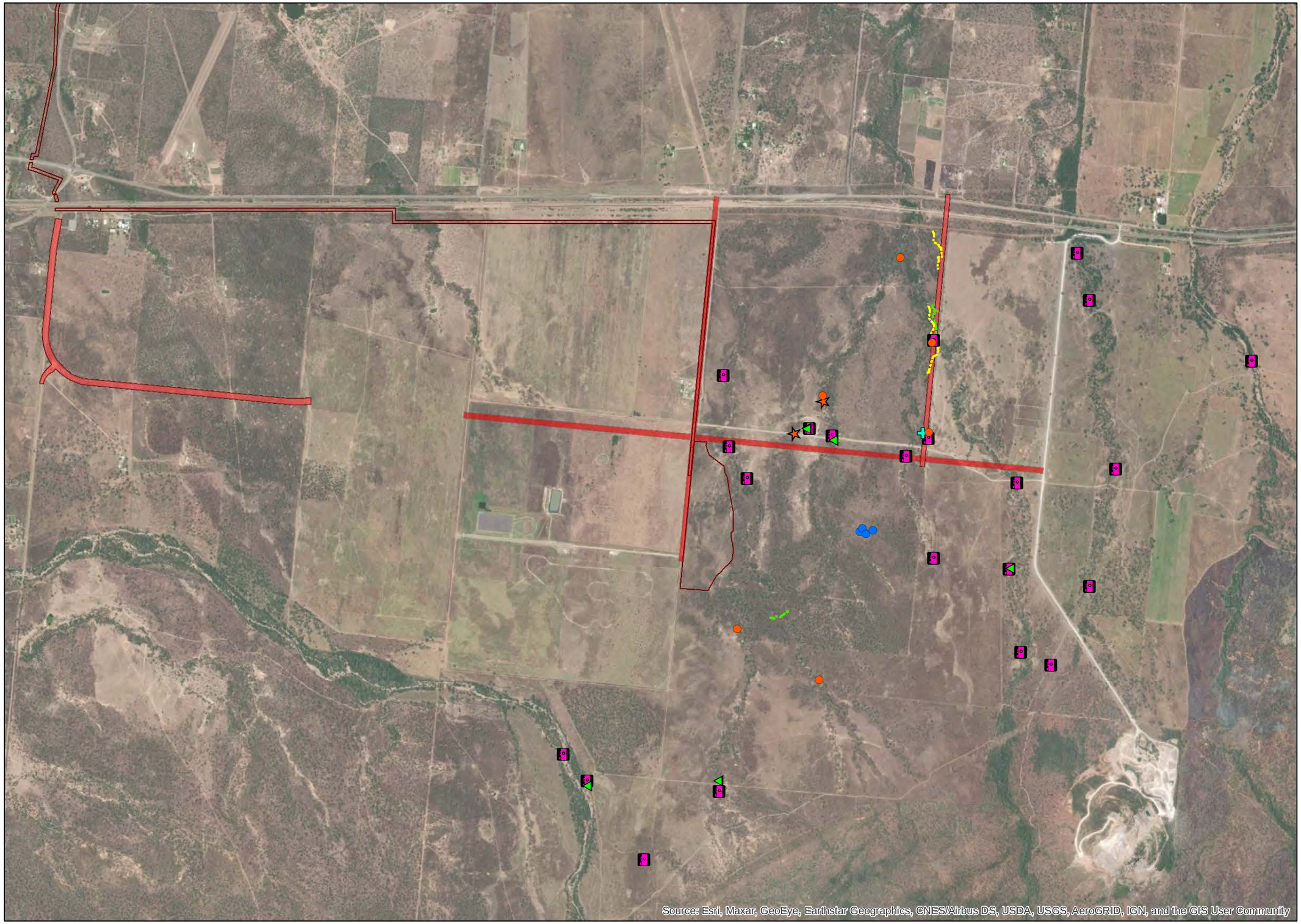
Issue	Date	Description	Drawn	Checked
A	7/11/2022	Preliminary	AL	AH

Lansdown Eco-Industrial Precinct

Date: 7/11/2022

Plan 1B Vegetation Assessments Road Lansdown A

Plan 2: Fauna Assessments



Legend

- Roads subject to survey
- LEIP Enabling Infrastructure R4
- Finch nests
- Potential microbat roosting habitat
- Diurnal survey additional
- Squatter Pigeon sightings
- Camera locations
- Audiomoth locations
- Koala scat meander
- Spotlight track

N

0 0.1 0.2 0.4 0.6 0.8 Kilometers

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

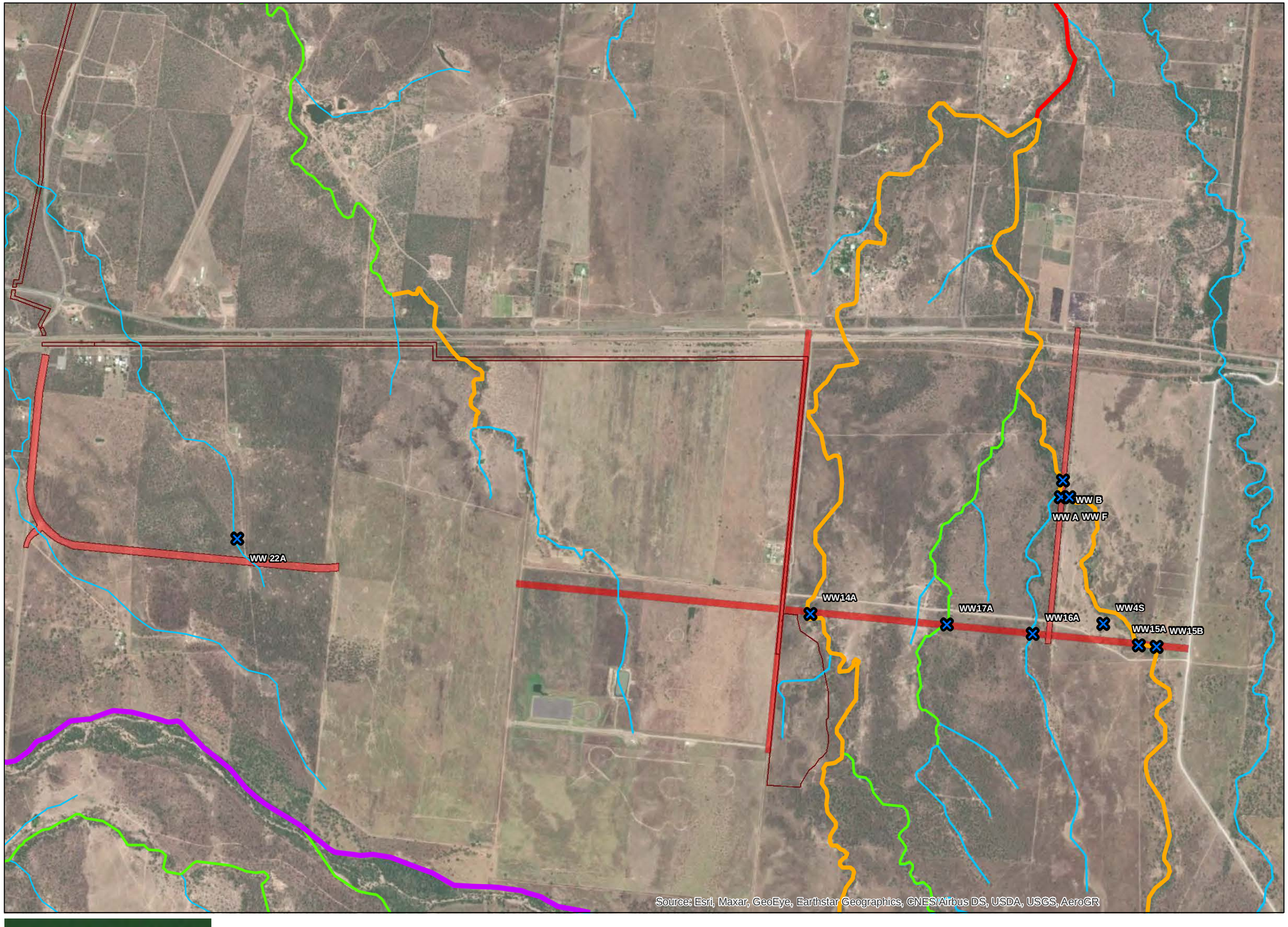
EVOLVE environmental solutions

Issue	Date	Description	Drawn	Checked
A	27/10/2022	Preliminary	AL	AH

Lansdown Eco-Industrial Precinct

Date: 27/10/2022
Plan 2 Fauna Assessments Road Lansdown A

Plan 3: Waterway Fisheries Assessments



Legend

- Waterway Observation Points
- Roads subject to survey
- LEIP Enabling Infrastructure R4

Qld Waterways for WWBW

Risk of Impact

- 1 - Low
- 2 - Moderate
- 3 - High
- 4 - Major
- Ordered drainage mapping

N

0 0.1 0.2 0.4 0.6 0.8 Kilometers

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator

EVOLVE environmental solutions

Issue	Date	Description	Drawn	Checked
A	7/11/2022	Preliminary	AL	AH

Lansdown Eco-Industrial Precinct

Date: 7/11/2022

Plan3 Waterway Assessments Road Lansdown A

Plan 3B: Fisheries Assessment - Photo Plan

EVOLVE environmental solutions

Issue	Date	Description	Drawn	Checked
A	7/11/2022	Preliminary	AL	AH

Lansdown Eco-Industrial Precinct

Date: 7/11/2022

Plan 3B Fisheries Road Lansdown A

Plan 3C: Fisheries Assessment - Photo Plan

EVOLVE environmental solutions

Issue	Date	Description	Drawn	Checked
A	7/11/2022	Preliminary	AL	AH

Lansdown Eco-Industrial Precinct

Date: 7/11/2022

Plan 3C Fisheries Road Lansdown A

4 Ecological survey results

4.1 Flora survey results

None of the recorded flora species were listed under the *EPBC Act 1999* or *NCA 1992*. A threatened flora likelihood of occurrence assessment is provided in **Appendix C** and remains consistent with that published in **Appendix C** of *Ecological Assessment Report – Lansdown Eco-Industrial Precinct, Woodstock Issue B.*

No Threatened Ecological Communities (TEC's) were flagged as having a probability of occurrence within the project area or buffer area by a PMST report generated for the project (refer to **Appendix A).** On-ground flora surveys of the project area found no evidence of any TEC's or associated Regional Ecosystems.

The majority of the project area is of reduced ecological value due to the extent of grazing and clearing disturbances. Ecological values pertaining to granivorous grassland and wetland utilising species including the endangered southern black-throated finch (*Poephila cincta cinta*), endangered eastern star finch (*Neochmia ruficauda ruficauda*) and vulnerable southern squatter pigeon (*Geophaps scripta scripta*) are present, though reduced due to altered species composition of the ground layer, reducing seed availability.

4.1.1 Quaternary assessments

Forty-two (42) quaternary transects were conducted within the proposed impact area in addition to vegetation surveys previously reported that were conducted on-site between 28th March and 1st April and 23rd to 27th May. Refer to **Appendix D** for quaternary survey data collected during the September and October survey periods encompassed by this report.

A substantial quantity of dried grass matter was observed during on-site surveys. This is attributed to seasonal fluctuation in grassy and soft herbaceous cover and prevailing dry conditions during both survey weeks.

The majority of survey locations were observed to have vegetation values consistent with their mapping, including a number of locations mapped as Category X non-remnant vegetation that lacked sufficient native woody cover to make a determination of regional ecosystem.

Q52S, Q54S, Q47S and Q49S were found to belong to different regional ecosystems than their mapped values. All four (4) survey points are located near a mapped change in regional ecosystem suggesting a mapping discrepancy with regards to the change of regional ecosystem.

Q58S to Q61S and Q64S to Q66S lacked canopy vegetation cover and therefore were unable to be accurately classified by regional ecosystem based on on-ground values, and further are not considered to meet remnant status. Q62S, Q63S, QAV and QAY were found to belong to different regional ecosystems than the values mapped. The mapped and on-ground values determined for each survey point are summarized in **Table 3**, below.

Table 3: Quaternary surveys mapped and observed on-ground vegetation values.

Survey reference	VMA mapping	Observed on-ground vegetation values.
Q1S	Non-remnant 11.3.30	Non-remnant 11.3
Q2S	Non-remnant 11.3.30	Non-remnant 11.3
Q3S	Non-remnant 11.3.30	Non-remnant 11.3
Q5S	Non-remnant 11.3.30	Non-remnant 11.3.30
Q6S	Non-remnant 11.3.35	Non-remnant 11.3
Q7S	Non-remnant 11.3.30	Non-remnant 11.3.30
Q46S	Remnant 11.3.30	Non-remnant 11.3
Q47S	Remnant 11.3.30	Non-remnant 11.3.35
Q48S	Remnant 11.3.30	Non-remnant 11.3
Q49S	Remnant 11.3.30	Remnant 11.3.35
Q50S	Remnant 11.3.30	Non-remnant 11.3
Q51S	Remnant 11.3.30	Remnant 11.3.30
Q52S	Remnant 11.3.35	Remnant 11.3.30 ecotone 11.3.35
Q53S	Remnant 11.3.35	Remnant 11.3.35
Q54S	Remnant 11.3.35	Remnant 11.3.30
Q55S	Remnant 11.3.35	Non-remnant 11.3
Q56S	Non-remnant 11.3.35	Non-remnant 11.3
Q57S	Non-remnant 11.3.30	Non-remnant 11.3
Q58S	Remnant 11.3.30	Non-remnant 11.3
Q59S	Remnant 11.3.30	Non-remnant 11.3
Q60S	Remnant 11.3.30	Non-remnant 11.3
Q61S	Remnant 11.3.30	Non-remnant 11.3
Q62S	Remnant 11.3.30	Remnant 11.3.35
Q63S	Remnant 11.3.30	Remnant 11.3.35
Q64S	Remnant 11.3.30	Non-remnant 11.3
Q65S	Remnant 11.3.30	Non-remnant 11.3
Q66S	Remnant 11.3.30	Non-remnant 11.3
Q67S	Non-remnant 11.3.30	Non-remnant 11.3
QD	Non-remnant 11.3.30	Non-remnant 11.3
QAM	Remnant 11.3.30	Remnant 11.3.30
QAN	Remnant 11.3.30	Remnant 11.3.30
QAO	Remnant 11.3.30	Non-remnant 11.3
QAP	Remnant 11.3.30	Remnant 11.3.30
QAQ	Remnant 11.3.30	Non-remnant 11.3
QAR	Remnant 11.3.30	Remnant 11.3.30
QAS	Remnant 11.3.30	Remnant 11.3.30
QAT	Remnant 11.3.30	Remnant 11.3.30
QAU	Remnant 11.3.30	Remnant 11.3.30
QAV	Remnant 11.3.30	Remnant 11.3.35
QAW	Remnant 11.3.30	Remnant 11.3.30
QAX	Remnant 11.3.30	Remnant 11.3.30
QAY	Remnant 11.3.35	Remnant 11.3.30

Both regional ecosystems 11.3.30 and 11.3.35 are Least concern as listed by the **VMA,** and contain comparable habitat values with regards to threatened species with potential likelihood of occurrence on-site including the Koala, Southern squatter pigeon and Southern black-throated finch.

4.1.2 BiCondition assessments

Twelve (12) BioCondition transects were conducted within the proposed impact area 12th September and 13th October as shown in **Plan 1B**, and full Biocondition data from these transects is provided in **Appendix E**.

Observed on-ground vegetation values differed from VMA mapped values for a number of BioCondition sample plots (Refer **Table 4**). BIO 01, BIO 02, BIO 07 and BIO A are all mapped as RE 11.3.30 but show on-ground species composition consistent with RE 11.3.35. As these areas of discrepancy from mapped values are not located within proximity of mapped regional ecosystem boundaries this may be reflective of a finer regional ecosystem mosaic being present within the landscape than captured by VMA mapping. RE 11.3.35 and RE 11.3.30 both have a VMA class of Least concern, contain Koala habitat values in the form of koala habitat trees, have the potential to contain tree hollows, and contain seeding grasses in their typical ground layer composition. As such the two regional ecosystems have comparable habitat values in terms of koala, hollow utilising and granivorous species.

Table 4; VMA mapped versus on-ground values of BioCondition transects.

Survey reference	VMA mapping	Observed on-ground vegetation values.
BIO 01	11.3.30	11.3.35
BIO 02	11.3.30	11.3.35
BIO 03	11.3.30	11.3.30
BIO 04	11.3.30	11.3.30
BIO 05	11.3.35	11.3.35
BIO 06	11.3.35	11.3.35
BIO 07	11.3.30	11.3.35
BIO 08	11.3.30	11.3.30
BIO A	11.3.30	11.3.35
BIO B	11.3.30	11.3.30
BIO C	11.3.30	11.3.30
BIO D	11.3.30	11.3.30

4.2 Waterways

Under the *Fisheries Act 1994,* a waterway includes a river, creek, stream, watercourse, drainage feature or inlet of the sea. From publicly available information provided by DAF, to meet the definition of a waterway at least one of the following attributes must be met:

5. *Defined bed and banks*
   The bed and banks need to be continuous upstream and downstream of the site rather than isolated and broken sections of a depression.
6. *An extended, if non-permanent, period of flow*
   Flow must continue beyond the duration of a rain event and have some reliability attached to rainfall. There is a need to distinguish between channels that funnel immediate localised rainfall; and waterways where flow has arisen from an upstream catchment.
7. *Flow adequacy*
   The flow needs to be sufficient to sustain basic ecological processes and habitats, and to maintain biodiversity within or across the feature. The adequacy of the flow depends on the ecological function of the channel e.g. waterways that connect to fish habitat like a wetland or waterhole may only need infrequent and short-duration flows to provide connectivity for fish.
8. *Fish habitat at, or upstream of, the site*
   Most instream features provide habitat for fish under adequate flow conditions or, in the case of pools, during dry periods. Therefore, it is important to have some knowledge of the fish species for the site and their habitat use, particularly in headwater streams. Periodic connectivity to upstream and off stream fish habitat are also considered fish habitat.

Assessment of ten (10) waterway locations within the project area were conducted using the four criteria above along with any other distinguishable features. Refer **Table 5** for waterway assessment. Where points align closely with previous waterway assessment points, these points have been labelled with the same number but a letter added, ie. WW 14A, and noted in **Table 5**.

Table 5; Waterways assessment

Survey reference, location and date	*Defined bed and banks*	*An extended, if non-permanent, period of flow*	*Flow adequacy*	*Fish habitat at, or upstream of, the site*	Distinguishable features
WW 14A* 19.632148 S, 146.821523 E 12-09-2022 (*Location aligns closely with WW 14 – May survey)	Yes – defined top of bank is approximately 1.5m high from lowest point of bed and 11m between top banks.	Potentially - no water was present during the time of survey. Bivalve shells were observed in the bed. Vegetation species found near bed and banks included *Lophostemon grandiflorus* & *Cyperus difformis*.	Yes – bank showed significant erosional evidence at time of survey indicating that a significant volume of water has flowed through the area in the recent past. Rocks and sand observed on riverbed. Snags were observed to 1.8m.	Possibly - No water pools were observed in the vicinity however multiple wetland indicator species were present at the observation point and upstream.	Vegetation species found near bed and banks included *Lophostemon grandiflorus* & *Cyperus difformis*.
WW 17A* 19.638969 S, 146.820947 E 12-09-2022 (*Location aligns closely with WW 17 – May survey)	Yes – defined top of bank is approximately 1.5m high from lowest point of bed and 3.5m between top banks.	Potentially - no water was present during the time of survey. Pooling was observed downstream. Bivalve shells were observed in the bed. Vegetation species found near bed and banks included *Lophostemon grandiflorus* & *Ludwigia octovalvis*	Yes – Steeply eroded banks. Bed was rocky. Snags were observed to 1.5m.	Possibly - No water pools were observed in the vicinity however multiple wetland indicator species were present at the observation point and upstream.	Vegetation species found near bed and banks included *Lophostemon grandiflorus*, *Eucalyptus crebra* & *Cryptostegia grandiflora.*
WW 15A* 19.648557 S, 146.819855 E 13-09-2022 (*Location aligns closely with WW 15 – May survey)	Yes – Defined top of bank is approximately 2m high from lowest point of bed and 14m between top banks.	Potentially - no water was present during the time of survey. Vegetation species found near bed and banks included *Lophostemon grandiflorus* & *Melaleuca leucadendra.*	Yes – Bed showed significant erosional evidence at the time of survey indicating that a significant volume of water has flowed through the area in the recent past. Bed was rocky. Snags were observed to 0.5m.	Yes – Fish habitat observed upstream at WW 24. Multiple wetland indicator species were present at the observation point and upstream.	Vegetation species found near bed and banks included Lophostemon grandiflorus & *Melaleuca leucadendra.*

Survey reference, location and date	*Defined bed and banks*	*An extended, if non-permanent, period of flow*	*Flow adequacy*	*Fish habitat at, or upstream of, the site*	Distinguishable features
WW 4S 19.646784 S, 146.820971 E 13-09-2022	Un-defined	None Evident	None Evident	None Evident	Vegetation species found near bed and banks included Corymbia tessellaris, *Eucalyptus crebra* and *Eucalyptus platyphylla*.
WW 15B* 19.649450 S, 146.819749 E 13-09-2022 (*Location aligns closely with WW 15 – May survey)	Yes – Defined top of bank is approximately 1.6m high from lowest point of bed and 9m between top banks.	Potentially - no water was present during the time of survey. Vegetation species found near bed and banks included *Lophostemon grandiflorus* & *Melaleuca sp*.	Yes – East bank showed significant steep erosional evidence at the time of survey indicating that a significant volume of water has flowed through the area in the recent past. Deposition of fine clay was observed in the bed. Snags were observed to 0.4m.	Yes – Fish habitat observed upstream at WW 24. Multiple wetland indicator species were present at the observation point and upstream.	Vegetation species found near bed and banks included *Lophostemon grandiflorus* & *Melaleuca leucadendra*.
WW 16A* 19.643264 S, 146.820461 E 13-09-2022 (*Location aligns closely with WW 16 – May survey)	Yes – Defined top of bank is approximately 0.4m high from lowest point of bed and 3.5m between top banks.	Potentially – no water was present during the time of survey. Vegetation species found near bed and banks included *Lophostemon grandiflorus*.	Potentially – Bed showed minor erosional evidence and clay deposition at the time of survey indicating that a significant volume of water has flowed through the area in the recent past.	None Evident	Vegetation species found near bed and banks included *Corymbia intemedia, Eucalyptus crebra, Lophostemon grandiflorus, Eremophila mitchellii, Atalaya hemiglauca* & *Ziziphus mauritiana.*
WW A 19.644679 S, 146.827636 E 10-10-2022	Yes – defined top of bank is approximately 1.6m high from lowest point of creek bed and 13m between top banks	Potentially - no water was present during the time of survey. Vegetation species found near bed and banks included *Lophostemon grandiflorus*, *Cyperus gracilis* and *Melaleuca sp.*	Yes – NW bank showed significant erosional evidence at time of survey indicating that a significant volume of water has flowed through the area in the recent past. Fine clay	Possibly - No water pools were observed in the vicinity however multiple wetland indicator species were present at the observation point and upstream.	Vegetation species found near bed and banks included *Lophostemon grandiflorus*, *Cyperus gracilis* and *Melaleuca sp.*, *Corymbia tesselaris* and *Cryptostegia grandiflora*.

Survey reference, location and date	*Defined bed and banks*	*An extended, if non-permanent, period of flow*	*Flow adequacy*	*Fish habitat at, or upstream of, the site*	Distinguishable features
			deposits were observed on banks.		
WW B 19.644767 S, 146.828531 E 10-10-2022	Yes - defined top of bank is approximately 3m high from lowest point of bed and 14m wide between top banks.	Potentially - no water was present during the time of survey. Vegetation species found near bed and banks included *Lophostemon grandiflorus*, and *Melaleuca sp.*	Yes – Erosional evidence was present around large tree roots at time of survey indicating that a significant volume of water has flowed through the area in the recent past. Fine clay deposits were observed on banks and in areas of the bed where water pooling is likely to occur.	Yes – Fish habitat observed upstream at WW 24. Multiple wetland indicator species were present at the observation point and upstream.	*Lophostemon grandiflorus* and *Melaleuca sp*. located on waterway banks.
WW F 19.645087 S, 146.827662 E 10-10-2022	Yes - defined top of bank is approximately 1.6m high from lowest point of bed and 13m wide between top banks.	Potentially – pooled water upstream and downstream of the location would suggest that flow exists. However, alteration of the waterway at multiple locations to form dammed areas for agricultural use as visible in arial imagery may affect the period of flow.	Potentially – pooled water upstream and downstream of the location would suggest that flow adequacy would exist.	Yes – Fish habitat observed upstream at WW 24. Multiple wetland indicator species were present at the observation point and upstream.	*Lophostemon grandiflorus, Melaleuca sp.* and *Cryptostegia grandiflora* located on waterway banks. Vehicle track crossing located directly adjacent to observation point.
WW 22A* 19.603653 S, 146.825352 E 14-10-2022 (*Location aligns closely with WW 22 – May survey)	No apparent depression	None Evident	None Evident – Small dam observed nearby, overland flow likely in the event of heavy rain.	None Evident	Vegetation species in the immediate vicinity included *Corymbia dallachiana*, *Eucalyptus platyphylla* & *Ziziphus mauritiana.*

All waterway observation points in **Table 5** meet the definition of a waterway under the *Fisheries Act 1994,* with the exception of WW4S and WW22A at which no waterway values were evident at the time of survey. These locations can only meet the definition of a waterway if an adequate extended period of flow occurs. Flow observations following recent rain events would be required to make this determination.

4.3 Fauna survey results

Eighty-eight (88) fauna species were recorded during the field survey effort within 1km of the road alignment shown in **Figure 1**, including domestic species. Seventy-two (72) of the detected species were native, with the majority (69) being avian species. Refer **Table 6** for full fauna species list, and **Photo Plate 1 to Photo Plate 3** for a selection of fauna species recorded from different visual survey methodologies.

Photo Plate 1; Sulphur crested cockatoo (left) and Southern squatter pigeon (right) observed adjacent to the road alignment.

Photo Plate 2; A Tawny frogmouth located by spotlighting surveys.

Photo Plate 3; Site camera trap captures.

Table 6; Site fauna species observations.

Class	Scientific name	Common name	Status	Source
Amphibia	*Litoria rubella*	Red tree-frog	LC	I, S
Amphibia	*Rhinella marina*	Cane toad	I	A, S
Aves	*Accipiter cirrocephalus*	Collared sparrowhawk	LC	I
Aves	*Acridotheres tristis*	Indian myna	LC	D, I
Aves	*Anas superciliosa*	Pacific black duck	LC	D
Aves	*Aprosmictus erythropterus*	Red-winged parrot	LC	D
Aves	*Ardeotis australis*	Australian bustard	LC	I
Aves	*Bubulcus ibis*	Cattle egret	LC	D
Aves	*Burhinus grallarius*	Bush Stone-curlew	LC	A, I
Aves	*Cacatua galerita*	Sulphur-crested cockatoo	LC	D, N
Aves	*Cacatua sanguinea*	Little corella	LC	D
Aves	*Calyptorhynchus banksii*	Red-tailed black-cockatoo	LC	D
Aves	*Centropus phasianinus*	Pheasant coucal	LC	A, D, I, N
Aves	*Cinnyris jugularis*	Yellow sunbird	LC	I
Aves	*Climacteris picumnus*	Brown treecreeper	LC	D
Aves	*Coracina novaehollandiae*	Black-faced cuckooshrike	LC	D
Aves	*Coracina papuensis*	White-bellied cuckooshrike	LC	D
Aves	*Corvus coronoides*	Australian raven	LC	A, C, D
Aves	*Coturnix chinensis*	King quail	LC	I
Aves	*Cracticus nigrogularis*	Pied butcherbird	LC	D
Aves	*Dacelo leachii*	Blue-winged kookaburra	LC	A, I
Aves	*Dacelo novaeguineae*	Laughing Kookaburra	LC	D, I
Aves	*Dicrurus bracteatus*	Spangled drongo	LC	D
Aves	*Egretta novaehollandiae*	White-faced heron	LC	I
Aves	*Entomyzon cyanotis*	Blue-faced honeyeater	LC	D
Aves	*Eolophus roseicapilla*	Galah	LC	D
Aves	*Ephippiorhynchus asiaticus*	Black-necked Stork	LC	C
Aves	*Falco longipennis*	Australian hobby	LC	D
Aves	*Gallus gallus domesticus*	Domestic chicken	I	A
Aves	*Geopelia humeralis*	Bar-shouldered dove	LC	D
Aves	*Geopelia placida*	Peaceful dove	LC	I
Aves	*Geophaps scripta scripta*	Southern squatter pigeon	V	D
Aves	*Grallina cyanoleuca*	Mudlark	LC	A, C, D
Aves	*Gymnorhina tibicen*	Australian magpie	LC	A, C, D
Aves	*Haliastur sphenurus*	Whistling kite	LC	D, I
Aves	*Hirundo rustica*	Barn Swallow	LC, M	D, I
Aves	*Lonchura castaneothorax*	Chestnut-breasted mannikin	LC	D
Aves	*Lophoictinia isura*	Square-tailed kite	LC	D
Aves	*Malrus melanocephalus*	Red-backed fairy-wren	LC	I
Aves	*Manorina melanocephala*	Noisy miner	LC	I
Aves	*Meliphaga lewinii*	Lewin's honeyeater	LC	D

Class	Scientific name	Common name	Status	Source
Aves	*Melithreptus albogularis*	White-throated honeyeater	LC	D
Aves	*Merops ornatus*	Rainbow bee-eater	LC	I
Aves	*Microeca fascinans*	Jacky winter	LC	I
Aves	*Microcarbo niger*	Little cormorant	LC	D
Aves	*Milvus migrans*	Black kite	LC	D
Aves	*Monarcha melanopsis*	Black-faced monarch	M	I
Aves	*Ninox boobook*	Southern Boobook	LC	I
Aves	*Ocyphaps lophotes*	Crested pigeon	LC	D, I
Aves	*Pandion haliaetus*	Osprey	LC	D
Aves	*Pardalotus rubricatus*	Red-browed pardalote	LC	D
Aves	*Peneothello pulverulenta*	Mangrove robin	LC	C, D
Aves	*Petrochelidon ariel*	Fairy martin	LC	S
Aves	*Philemon buceroides*	Helmeted friarbird	LC	D
Aves	*Philemon corniculatus*	Noisy friarbird	LC	A, D
Aves	*Platycercus adscitus*	Pale-headed rosella	LC	D
Aves	*Podargus strigoides*	Tawny frogmouth	LC	S
Aves	*Poodytes gramineus*	Little grassbird	LC	D
Aves	*Ramsayornis modestus*	Brown-backed honeyeater	LC	D
Aves	*Rhipidura albiscapa*	Grey fantail	LC	D
Aves	*Rhipidura leucophrys*	Willie wagtail	LC	I
Aves	*Sericornis frontalis*	White-browed scrubwren	LC	D
Aves	*Strepera graculina*	Pied currawong	LC	A, I
Aves	*Taeniopygia bichenovii*	Double-barred finch	LC	D
Aves	*Threskiornis molucca*	Australian white ibis	LC	D, I, N
Aves	*Threskiornis spinicollis*	Straw-necked ibis	LC	D, I
Aves	*Todiramphus macleayii*	Forest kingfisher	LC	D
Aves	*Todiramphus sanctus*	Sacred kingfisher	LC	D
Aves	*Trichoglossus moluccanus*	Rainbow lorikeet	LC	A, D
Aves	*Vanellus miles*	Masked lapwing	LC	A, D, I
Aves	*Zosterops luteus*	Yellow white-eye	LC	D
Mammalia	*Bos taurus*	Domestic cattle	I	C, I, S
Mammalia	*Canis lupus*	Dog	R	C, S
Mammalia	*Capra hircus*	Domestic goat	I	S
Mammalia	*Felis catus*	Domestic cat	I	C, I
Mammalia	*Macropus giganteus*	Eastern grey kangaroo	LC	I
Mammalia	*Notamacropus agilis*	Agile wallaby	LC	C, I, S
Mammalia	*Ovis aries*	Domestic sheep	I	I
Mammalia	*Peramelidae spp.*	Bandicoot	LC	S
Mammalia	*Rattus sp.*	Rat	I	C
Mammalia	*Sus scrofa*	Feral pig	I	C
Mammalia	*Vulpes vulpes*	Red fox	R	I
Reptillia	*Acanthophis praelongus*	Northern death adder	LC	I
Reptillia	*Demansia psammophis*	Yellow-faced whip snake	LC	I

Class	Scientific name	Common name	Status	Source
Reptillia	*Dendrelaphis punctulatus*	Common green tree snake	LC	I
Reptillia	*Lampropholis delicata*	Garden skink	LC	I
Reptillia	*Pseudonaja textilis*	Eastern brown snake	LC	I
Reptillia	*Varanus varius*	Lace monitor	LC	I

Key for interpretation of fauna species observations.

Code	Observation source	Code	Species status
A	Audio observation	**E**	Endangered
C	Camera trap	**I**	Introduced species
D	Targeted diurnal surveys	**LC**	Least Concern
I	Incidental observation	**R**	Restricted matter
N	Spotlighting works	**V**	Vulnerable
S	Identified from traces	**M**	EPBC Act 1999 listed migratory species

4.3.1 Threatened and migratory fauna species

One (1) threatened species was detected by on-ground survey effort, being the Southern squatter pigeon *Geophaps scripta scripta,* listed as vulnerable under the *NCA* and *EPBC*.

Two (2) species listed as migratory by the EPBC Act 1999 were recorded, being the Black-faced monarch (*Monarcha melanopsis)* and the Barn swallow *(Hirundo rustica).*

Foraging habitat for the Bare-rumped sheathtail bat (*Saccolaimus saccolaimus nudicluniatus)* is present within the road alignment in the form of woodland and grassland supporting flying insect species. Two potential roosting hollows were identified by Evolve within the road alignment in October. Potential roosting hollows require expert assessment to confirm microbat usage due to issues of safe access and species behaviour of being silent at roosting sites.

A summary of threatened and migratory fauna species considered to have a likely or known occurrence within the precinct road alignment based on site surveys is provided in **Table 7**. For a full fauna species likelihood of occurrence assessment for the precinct road alignment, refer to **Appendix F**.

It should be noted that this likelihood of occurrence assessment differs from the species likelihood of occurrence assessment provided in *Ecological Assessment Report – Lansdown Eco-Industrial Precinct, Woodstock* Issued on 29th April 2022 and reflects the absence of wetland habitat within the road alignment area.

Table 7; Fauna species likelihood of occurrence summary.

Class	Scientific name	Common name	EPBC Act Status	Likelihood of occurrence
Aves	*Hirundo rustica*	Barn Swallow	Migratory	Known
Aves	*Cuculus optatus*	Oriental cuckoo	Migratory	Likely
Aves	*Poephila cincta cincta*	Black throated finch (white rumped)	E	Likely
Aves	*Geophaps scripta scripta*	Squatter pigeon (southern)	V	Known
Aves	*Monarcha melanopsis*	Black-faced monarch	Migratory Marine	Known
Mammalia	*Saccolaimus saccolaimus nudicluniatus*	Bare-rumped sheathtail bat	V	Likely

4.3.1.1 Granivorous species: Black-throated finch and Southern squatter pigeon

The Southern black-throated finch and Southern squatter pigeon are both granivorous species, dependent on seeding grasses as a primary food source.

Both northern and southern sub-species of the Black-throated Finch are considered to occur within 5km of water sources. Based upon delineation from permanent water sources visible from aerial imagery, including farm dams, all of the proposed impact area falls within 5km of a water source. It is noted that disused finch nests from unknown species were located on site during the September surveys (Refer **Photo Plate 4**).

Although undergoing seasonal variation in abundance, seeding grass species, including introduced species were recorded from all twelve (12) BioCondition vegetation surveys conducted between 12th September and 14th October, forty (40) out of forty-two (42) or 95.2% of quaternary vegetation surveys conducted during the same period recorded the presence of seeding grass species.

Photo Plate 4; Two of the disused finch-nests found on-site during September surveys, bottle-shaped structure typical of Black-throated finch and other finch species known to be on-site is clearly visible in the RHS nest.

4.3.1.2 Migratory species

The Black-faced monarch mainly occurs in rainforest ecosystems, which are not present on-site, however is known to utilise open eucalypt forests, especially in gullies with a dense, shrubby understory as well as in dry sclerophyll forests and woodlands, often with a patchy understory (especially during winter and migration). Southward migration occurs in September, with birds returning northward in March. These marginal habitats occur in multiple locations within the alignment with the sighted individual being recorded from riparian vegetation during September site surveys.

Similar to the Black-faced monarch, the Oriental cuckoo may occur in wet eucalypt forest and river margins. The species is seasonally present in northern Australia during the winter.

5 Conclusion

Evolve Environmental Solutions were commissioned to conduct ecological survey works to support the implementation of the Lansdown Eco-Industrial Precinct Road Alignment Project. Site surveys have been conducted to assess the following:

- Vegetation composition;
- Waterway and wetland values; and
- Fauna species presence.

Vegetation surveys found vegetation within the project site to be largely consistent with values mapped under the *VMA 1999* with the exception of the following:

- Discrepancies regarding the location of boundaries between RE 11.3.30 and RE 11.3.35, including patches of RE 11.3.30 within areas mapped as RE 11.3.35.
- Areas of vegetation mapped as remnant vegetation under the *VMA 1999* but found to be lacking canopy vegetation layers.

No threatened flora species were located by on-site surveys. Flora likelihood of occurrence assessment concluded that threatened flora species to occur within the project area (Refer to **Appendix C**).

Following on-site assessment, Evolve have highlighted that the site has potentially suitable habitat for multiple MNES fauna species as summarized in **Table 7**. A full fauna likelihood of occurrence assessment has been conducted for the precinct road alignment and as provided in **Appendix F.**

The extent of potential habitat for water-source dependent granivorous species, including the Southern squatter pigeon and White rumped black-throated finch is considered to include the entirety of the proposed impact area on the basis that:

- All areas fall within 5km of permanent water sources.
- 100% of BioCondition transects and 95.7% of quaternary vegetation assessment points were recorded to contain foraging opportunities for granivorous species in the form of seed producing grasses.

White rumped black-throated finches require woody vegetation cover for nesting, and breeding habitat for this species is therefore considered to be a subset of foraging habitat containing woody vegetation cover. Multiple finch-nests were located by survey efforts but were unable to be identified to a species level due to degradation.

It is recommended that clearing of Koala (*Phascolarctos cinereus*) habitat; Southern squatter pigeon (*Geophaps scripta scripta)* habitat; White rumped black-throated finch (*Poephila cincta cincta)* habitat, Oriental cuckoo (*Cuculus optatus)* habitat; Black-faced monarch (*Monarcha melanopsis);* and Bare-rumped sheathtail bat (*Saccolaimus saccolaimus nudicluniatus)* habitat be referred under the *Environment Protection and Biodiversity Conservation Act 1999*.

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7 Appendices

Appendix A

Protected Matters Report

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 25-Oct-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	24
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Bowling green bay	20 - 30km upstream from Ramsar site	In feature area

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Poephila cincta cincta			
Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area	In feature area
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
Hipposideros semoni			
Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides minor			
Greater Glider (northern), Greater Glider (north-eastern Queensland) [92008]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Rhinolophus robertsi			
Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
PLANT			
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus raveretiana Black Ironbox [16344]	Vulnerable	Species or species habitat may occur within area	In feature area
Leichhardtia brevifolia listed as Marsdenia brevifolia [91893]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Omphalea celata [64586]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Symposiachrus trivirgatus as Monarcha trivirgatus](#)			
Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area
Reptile			
[Crocodylus porosus](#)			
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
[Lansdown Eco-Industrial Precinct Access Road](#)	2022/09281		Completed	In feature area
[Queensland Pacific Metals - Townsville Energy Chemicals Hub TECH Project](#)	2021/9033		Approval	In feature area
Controlled action				
[Gas pipeline](#)	2002/728	Controlled Action	Post-Approval	In feature area
Not controlled action				
[Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia](#)	2015/7522	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
[275kV Transmission Line from Ross substation to Strathmore Substation (approx 180km)](#)	2008/4390	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix B

Wildnet Species Record List

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: All
Records: All
Date: All
Latitude: -19.6464
Longitude: 146.8209
Distance: 8
Email: zlutz@evolveenvironmental.com.au
Date submitted: Wednesday 26 Oct 2022 11:18:37
Date extracted: Wednesday 26 Oct 2022 11:20:02

The number of records retrieved = 324

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			6
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		1
animals	amphibians	Hylidae	*Cyclorana novaehollandiae*	eastern snapping frog		C		1
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		3
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		1
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		4
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		2/2
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		1
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		6
animals	birds	Acanthizidae	*Gerygone palpebrosa*	fairy gerygone		C		2
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		1
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		2
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		9
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		13
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		4
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		5
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		6
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		13
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		16
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		3
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		37
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		1
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		48
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		1
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		1
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		7
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		2
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		7
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		32
animals	birds	Anatidae	*Aythya australis*	hardhead		C		9
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		4
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		14
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		12
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		15
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		6
animals	birds	Anatidae	*Nettapus pulchellus*	green pygmy-goose		C		8
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		30
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		29
animals	birds	Apodidae	*Aerodramus terraereginae*	Australian swiftlet		C		1
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		22
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		20
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		15
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		7
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		8
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		18

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	*Ixobrychus flavicollis*	black bittern		C		1
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		4
animals	birds	Artamidae	*Artamus cinereus*	black-faced woodswallow		C		21
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		29
animals	birds	Artamidae	*Artamus personatus*	masked woodswallow		C		2
animals	birds	Artamidae	*Artamus superciliosus*	white-browed woodswallow		C		3
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		27
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		10
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		34
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		14
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		3
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		29
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		33
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		1
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		3
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		32
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		44
animals	birds	Campephagidae	*Edolisoma tenuirostre*	common cicadabird		C		2
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		1
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		25
animals	birds	Caprimulgidae	*Caprimulgus macrurus*	large-tailed nightjar		C		2
animals	birds	Casuariidae	*Dromaius novaehollandiae*	emu		C		1
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		5
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		25
animals	birds	Charadriidae	*Vanellus tricolor*	banded lapwing		C		2
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		9
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		10
animals	birds	Columbidae	*Geopelia cuneata*	diamond dove		C		4
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		18
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		50
animals	birds	Columbidae	*Geophaps scripta*	squatter pigeon		C		15
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		37
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		2
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		18
animals	birds	Corcoracidae	*Corcorax melanorhamphos*	white-winged chough		C		5
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		18
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		25
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		25
animals	birds	Corvidae	*Corvus sp.*			C		1
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		6
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		11
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		20
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		28
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		8
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cuculidae	*Chalcites minutillus*	little bronze-cuckoo		C		7
animals	birds	Cuculidae	*Chalcites minutillus russatus*	Gould's bronze-cuckoo		C		4
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		7
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		8
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		37
animals	birds	Estrildidae	*Heteromunia pectoralis*	pictorella mannikin		C		1
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		17
animals	birds	Estrildidae	*Lonchura punctulata*	nutmeg mannikin	Y			4
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		16
animals	birds	Estrildidae	*Neochmia phaeton*	crimson finch		C		2
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		1
animals	birds	Estrildidae	*Poephila cincta cincta*	black-throated finch (white-rumped subspecies)		E	E	13
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		42
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		14
animals	birds	Eurostopodidae	*Eurostopodus argus*	spotted nightjar		C		3
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		18
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		15
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		5
animals	birds	Falconidae	*Falco peregrinus*	peregrine falcon		C		4
animals	birds	Gruidae	*Antigone rubicunda*	brolga		C		10
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		47
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		28
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		42
animals	birds	Halcyonidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		7
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		24
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		8
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		15
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		10
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		19
animals	birds	Laridae	*Gelochelidon nilotica*	gull-billed tern		SL		2
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		5
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		23
animals	birds	Megaluridae	*Cincloramphus mathewsi*	rufous songlark		C		11
animals	birds	Megaluridae	*Cincloramphus timoriensis*	tawny grassbird		C		2
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		2
animals	birds	Meliphagidae	*Conopophila rufogularis*	rufous-throated honeyeater		C		15
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		30
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		28
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		14
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		1
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		7
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		40
animals	birds	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater		C		7
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		1
animals	birds	Meliphagidae	*Philemon buceroides*	helmeted friarbird		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		36
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		15
animals	birds	Meliphagidae	*Ramsayornis fasciatus*	bar-breasted honeyeater		C		3
animals	birds	Meliphagidae	*Ramsayornis modestus*	brown-backed honeyeater		C		21
animals	birds	Meliphagidae	*Stomiopera flava*	yellow honeyeater		C		47
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		41
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		47
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		1
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		9
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		30
animals	birds	Monarchidae	*Symposiachrus trivirgatus*	spectacled monarch		SL		1
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		8
animals	birds	Nectariniidae	*Cinnyris jugularis*	olive-backed sunbird		C		24
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		12
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		1
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		17
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		13
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		16
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		7
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		23
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		29
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			1
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		12
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		9
animals	birds	Petroicidae	*Microeca flavigaster*	lemon-bellied flycatcher		C		30
animals	birds	Petroicidae	*Petroica goodenovii*	red-capped robin		C		1
animals	birds	Petroicidae	*Poecilodryas superciliosa*	white-browed robin		C		1
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		23
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		9
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		21
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		1
animals	birds	Phasianidae	*Synoicus ypsilophorus*	brown quail		C		5
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		1
animals	birds	Podicipedidae	*Podiceps cristatus*	great crested grebe		C		4
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		7
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		7
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		16
animals	birds	Psittacidae	*Melopsittacus undulatus*	budgerigar		C		4
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		42
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		17
animals	birds	Psittacidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		24
animals	birds	Ptilonorhynchidae	*Chlamydera nuchalis*	great bowerbird		C		19
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		3
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		1
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		32
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		36
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		3
animals	birds	Rhipiduridae	*Rhipidura rufiventris*	northern fantail		C		1
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		1
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		4
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		12
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		13
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		13
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		2
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		20
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		31
animals	birds	Turnicidae	*Turnix maculosus*	red-backed button-quail		C		3
animals	birds	Turnicidae	*Turnix pyrrhothorax*	red-chested button-quail		C		2
animals	birds	Turnicidae	*Turnix velox*	little button-quail		C		1
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		4
animals	mammals	Macropodidae	*Lagorchestes conspicillatus*	spectacled hare-wallaby		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		2
animals	mammals	Macropodidae	*Notamacropus agilis*	agile wallaby		C		1
animals	mammals	Suidae	*Sus scrofa*	pig	Y			3
animals	reptiles	Agamidae	*Diporiphora australis*	tommy roundhead		C		1
animals	reptiles	Chelidae	*Chelodina canni*	Cann's longneck turtle		C		1
animals	reptiles	Chelidae	*Emydura macquarii krefftii*	Krefft's river turtle		C		1/1
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		1
animals	reptiles	Diplodactylidae	*Amalosia rhombifer*	zig-zag gecko		C		1/1
animals	reptiles	Diplodactylidae	*Diplodactylus platyurus*	eastern fat-tailed gecko		C		1/1
animals	reptiles	Diplodactylidae	*Oedura castelnaui*	northern velvet gecko		C		1/1
animals	reptiles	Elapidae	*Cryptophis nigrostriatus*	black-striped snake		C		1/1
animals	reptiles	Elapidae	*Furina diadema*	red-naped snake		C		1/1
animals	reptiles	Elapidae	*Pseudonaja nuchalis sensu lato*	western brown snake		C		1
animals	reptiles	Elapidae	*Suta suta*	myall snake		C		1/1
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		1
animals	reptiles	Pygopodidae	*Delma tincta*	excitable delma		C		1/1
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		1/1
animals	reptiles	Scincidae	*Praeteropus gowi*	speckled worm-skink		C		1
animals	reptiles	Typhlopidae	*Anilios affinis*	small-headed blind snake		C		4/4
animals	reptiles	Typhlopidae	*Anilios ligatus*	robust blind snake		C		1/1
animals	reptiles	Varanidae	*Varanus scalaris*	spotted tree monitor		C		1/1
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				1/1
plants	land plants	Acanthaceae	*Graptophyllum excelsum*			NT		1/1
plants	land plants	Amaranthaceae	*Amaranthus interruptus*			C		1/1
plants	land plants	Amaranthaceae	*Amaranthus spinosus*	needle burr	Y			1/1
plants	land plants	Amaranthaceae	*Gomphrena humilis*			C		1/1
plants	land plants	Anacardiaceae	*Euroschinus falcatus var. angustifolius*			C		1/1
plants	land plants	Apocynaceae	*Cryptostegia grandiflora*	rubber vine	Y			3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Apocynaceae	*Cynanchum pedunculatum*			C		1/1
plants	land plants	Apocynaceae	*Parsonsia lenticellata*	narrow-leaved parsonsia		C		3/3
plants	land plants	Apocynaceae	*Wrightia saligna*			C		1/1
plants	land plants	Asteraceae	*Camptacra barbata*			C		1/1
plants	land plants	Asteraceae	*Cyanthillium cinereum*			C		1/1
plants	land plants	Asteraceae	*Ozothamnus cassinioides*			C		1/1
plants	land plants	Asteraceae	*Peripleura hispidula var. setosa*			C		1/1
plants	land plants	Asteraceae	*Peripleura scabra*			C		1/1
plants	land plants	Asteraceae	*Pterocaulon ciliosum*			C		1/1
plants	land plants	Asteraceae	*Pterocaulon serrulatum var. serrulatum*			C		1/1
plants	land plants	Boraginaceae	*Trichodesma zeylanicum var. zeylanicum*			C		1/1
plants	land plants	Campanulaceae	*Lobelia quadrangularis*			SL		1/1
plants	land plants	Chenopodiaceae	*Chenopodium murale*	green fat-hen	Y			1/1
plants	land plants	Commelinaceae	*Commelina ensifolia*	scurvy grass		C		1/1
plants	land plants	Convolvulaceae	*Ipomoea brassii*			C		1/1
plants	land plants	Convolvulaceae	*Ipomoea polymorpha*			C		1/1
plants	land plants	Convolvulaceae	*Polymeria marginata*			C		1/1
plants	land plants	Convolvulaceae	*Xenostegia tridentata*			C		1/1
plants	land plants	Cornaceae	*Alangium polyosmoides subsp. tomentosum*			C		1/1
plants	land plants	Cyperaceae	*Cyperus concinnus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus distans*			C		1/1
plants	land plants	Cyperaceae	*Cyperus gracilis*			C		1/1
plants	land plants	Cyperaceae	*Cyperus platystylis*			C		1/1
plants	land plants	Cyperaceae	*Cyperus procerus*			C		1/1
plants	land plants	Cyperaceae	*Eleocharis geniculata*			C		1/1
plants	land plants	Cyperaceae	*Fimbristylis littoralis*			C		1/1
plants	land plants	Cyperaceae	*Fimbristylis sieberiana*			C		1/1
plants	land plants	Cyperaceae	*Schoenus falcatus*			C		1/1
plants	land plants	Cyperaceae	*Scleria brownii*			C		1/1
plants	land plants	Cyperaceae	*Scleria sphacelata*			C		1/1
plants	land plants	Ebenaceae	*Diospyros geminata*	scaly ebony		C		1/1
plants	land plants	Gentianaceae	*Canscora diffusa*			C		1/1
plants	land plants	Lamiaceae	*Anisomeles moschata*			C		1/1
plants	land plants	Lamiaceae	*Coleus congestus*			C		1/1
plants	land plants	Lamiaceae	*Teucrium modestum*			C		1/1
plants	land plants	Leguminosae	*Acacia jackesiana*			C		1/1
plants	land plants	Leguminosae	*Acacia salicina*	doolan		C		1/1
plants	land plants	Leguminosae	*Acaciella*					1/1
plants	land plants	Leguminosae	*Acaciella angustissima*	white ball acacia	Y			5/5
plants	land plants	Leguminosae	*Albizia*					1/1
plants	land plants	Leguminosae	*Butea monosperma*		Y			1/1
plants	land plants	Leguminosae	*Crotalaria spectabilis*	showy rattlepod	Y			1/1
plants	land plants	Leguminosae	*Crotalaria verrucosa*			C		2/2
plants	land plants	Leguminosae	*Erythrina vespertilio subsp. vespertilio*			C		1/1
plants	land plants	Leguminosae	*Falcataria toona*			C		2/2
plants	land plants	Leguminosae	*Flemingia parviflora*	flemingia		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Leguminosae	*Indigofera polygaloides*			C		1/1
plants	land plants	Leguminosae	*Indigofera tryonii*			C		1/1
plants	land plants	Leguminosae	*Leucaena leucocephala*		Y			10
plants	land plants	Leguminosae	*Senegalia*					1/1
plants	land plants	Leguminosae	*Senna occidentalis*	coffee senna	Y			1/1
plants	land plants	Leguminosae	*Tephrosia astragaloides*			C		1/1
plants	land plants	Leguminosae	*Tephrosia brachyodon*			C		1/1
plants	land plants	Leguminosae	*Tephrosia juncea*			C		1/1
plants	land plants	Leguminosae	*Vachellia bidwillii*			C		1/1
plants	land plants	Lentibulariaceae	*Utricularia aurea*	golden bladderwort		SL		1/1
plants	land plants	Lythraceae	*Ammannia multiflora*	jerry-jerry		C		1/1
plants	land plants	Lythraceae	*Lythrum paradoxum*			C		1/1
plants	land plants	Malpighiaceae	*Stigmaphyllon australiense*			C		2/2
plants	land plants	Malvaceae	*Abutilon micropetalum*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus brownii*	Reid River box		C		2/2
plants	land plants	Myrtaceae	*Eucalyptus persistens*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus xanthoclada*	yellow-branched ironbark		C		1/1
plants	land plants	Myrtaceae	*Eugenia reinwardtiana*	beach cherry		C		1/1
plants	land plants	Myrtaceae	*Gossia bidwillii*			C		1/1
plants	land plants	Myrtaceae	*Lophostemon grandiflorus subsp. riparius*			C		2/2
plants	land plants	Myrtaceae	*Melaleuca bracteata*			C		1/1
plants	land plants	Phyllanthaceae	*Phyllanthus novae-hollandiae*			C		1/1
plants	land plants	Poaceae	*Arthragrostis deschampsioides*			C		1/1
plants	land plants	Poaceae	*Arundinella setosa*			C		1/1
plants	land plants	Poaceae	*Chionachne cyathopoda*	river grass		C		1/1
plants	land plants	Poaceae	*Cynodon aethiopicus*		Y			1/1
plants	land plants	Poaceae	*Dinebra decipiens var. asthenes*			C		1/1
plants	land plants	Poaceae	*Eragrostis parviflora*	weeping lovegrass		C		1/1
plants	land plants	Poaceae	*Oryza*					1/1
plants	land plants	Poaceae	*Panicum trichoides*			C		2/2
plants	land plants	Polypodiaceae	*Drynaria sparsisora*			SL		1/1
plants	land plants	Putranjivaceae	*Drypetes deplanchei*	grey boxwood		C		1/1
plants	land plants	Rhamnaceae	*Ventilago viminalis*	supplejack		C		1/1
plants	land plants	Rhamnaceae	*Ziziphus mauritiana*	Indian jujube	Y			1
plants	land plants	Rubiaceae	*Pavetta australiensis var. australiensis*			C		1/1
plants	land plants	Rubiaceae	*Psychotria fitzalanii*			C		1/1
plants	land plants	Rubiaceae	*Scleromitrion polycladum*			NT		2/2
plants	land plants	Rubiaceae	*Spermacoce brachystema*			C		1/1
plants	land plants	Rubiaceae	*Timonius timon var. timon*			C		1/1
plants	land plants	Sapindaceae	*Alectryon tomentosus*			C		1/1
plants	land plants	Sapindaceae	*Harpullia pendula*			C		1/1
plants	land plants	Sapotaceae	*Amorphospermum antilogum*			C		1/1
plants	land plants	Solanaceae	*Nicotiana glauca*	tree tobacco	Y			1/1
plants	land plants	Solanaceae	*Solanum cookii*			C		1/1
plants	land plants	Sparrmanniaceae	*Grewia*					1/1
plants	land plants	Sparrmanniaceae	*Grewia savannicola*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Thymelaeaceae	*Pimelea sericostachya*			C		1/1
plants	land plants	Vitaceae	*Causonis trifolia*			C		1/1
plants	land plants	Vitaceae	*Cissus oblonga*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix C

Flora Likelihood of Occurrence Assessment

Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
Acanthaceae	*Graptophyllum excelsum*	Scarlet Fuchsia	-	NT	*Graptophyllum excelsum* occurs in semi-evergreen vine thickets, although near Chillagoe the species has also been recorded growing in grassy woodland in association with *Eucalyptus cullenii* and *Corymbia erythrophloia*. Other associated species include *Macropteranthes* sp., *Gyrocarpus americanus*, *Lysiphyllum hookeri*, *Acacia fasciculifera*, *Brachychiton australis*, *Polyscias elegans*, *Archidendropsis thozetiana*, *Gossia bidwillii*, *Alstonia constricta*, *Alyxia ruscifolia* and *Alchornea ilicifolia.*	**Unlikely to occur.** Ideal vine thicket habitat not found in impact area.
Rubiaceae	*Scleromitrion polycladum*	-	-	NT	Occurs in NEQ and in the northern part of CEQ. Altitudinal range from 160-300 m. Grows along drainage lines in forest and vine thicket, occasionally in woodland.	**Unlikely to occur.** Ideal habitat not found in impact area, and outside altitudinal range.
Poaceae	*Dichanthium setosum*	Bluegrass	V	-	*Dichanthium setosum* is associated with heavy basaltic black soils and red-brown loams with clay subsoil. Associated species include White Box (*Eucalyptus albens*), Silver-leaved Ironbark (*Eucalyptus melanophloia*), Yellow Box (*Eucalyptus melliodora*), Manna Gum (*Eucalyptus viminalis*), Amulla (*Myoporum debile*), Purple Wire-grass (*Aristida ramosa*), Kangaroo Grass (*Themeda triandra*), Fine-leaved Tussock-grass (*Poa sieberiana*), Red-leg Grass (*Bothriochloa ambigua*), Pitted Blue-grass (*Bothriochloa decipiens*), Macrozamia stenomera, Small Woolly Burr-medic (*Medicago minima*), Scaly Buttons (*Leptorhynchos squamatus*), *Lomandra* aff. longifolia, Australian Bugle (*Ajuga australis*), Bogan-flea (*Calotis hispidula*) and *Austrodanthonia* spp., *Dichopogon* spp.,	**Unlikely to occur.** Whilst potential habitat and two associated species (*Themeda triandra* and *Bothriochloa decipiens*) were recorded by on-site surveys, the species has not been previously recorded within the proposed impact area or local surrounds.

Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
					Brachyscome spp., *Vittadinia* spp., *Wahlenbergia* spp. and *Psoralea* spp. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. The species may tolerate or benefit from disturbance, otherwise, disturbance is indicative of threatening processes in its habitat,	
Myrtaceae	*Eucalyptus raveretiana*	Black Ironbox	V	-	Eucalyptus raveretiana grows along watercourses and occasionally on river flats. It occurs in open forest or woodland communities. The species prefers sites with moderately fertile soil and adequate sub-soil moisture. The alluvial soils in which it grows are sands, loams, light clays or cracking clays.	**Unlikely to occur.** Not previously recorded within the impact area and local surrounds. Potential habitat occurs within the proposed impact area.
Apocynaceae	*Marsdenia brevifolia*	-	V	V	North of Rockhampton, M. brevifolia grows on serpentine rock outcrops or crumbly black soils derived from serpentine in eucalypt woodland, often with Broad-leaved Ironbark (*Eucalyptus fibrosa*) and *Corymbia xanthope*. At Hidden Valley near Paluma, plants grow in woodland on granite soils dominated by Granite Ironbark (*E. granitica*), Rustyjacket (*C. leichhardtii*) and White Mahogany (*E. acmenoides*). On Magnetic Island the species occurs in open forest on dark acid agglomerate soils dominated by Narrow-leafed Ironbark (*E. drepanophylla*).	**Unlikely to occur.** Not previously recorded within the impact area and local surrounds. No potential habitat observed within the impact area and surrounds.
Euphorbiaceae	*Omphalea celata*	-	V	V	Occurs in fragmented semi evergreen vine thicket or araucarian microphyll vine forest. Recorded along watercourses in steep sided gorges and gullies on weathered metamorphic or granitic soils. Associated species include	**Unlikely to occur.** Not previously recorded within the impact area and local surrounds. Limited very marginal habitat present within the impact area and surrounds.

Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
					Eucalyptus raveretiana, *E. tereticornis, Lysiphyllum hooker*i and *Ficus opposita*.	
Fabaceae	*Tephrosia leveillei Syn. Tephrosia flagellaris*	-	V	-	*Tephrosia leveillei* has been recorded include occurring within the following habitat; • Cullen's Ironbark (*Eucalyptus cullenii*) woodland on alluvial plains • Gum-topped Bloodwood (*Corymbia erythrophloia*) and Cooktown Ironwood (*Erythrophleum chlorostachys*) woodland with Bushman's Clothes-peg (Grevillea glauca) • *Eucalyptus spp*. and *Corymbia spp*. tall open forest over dense Bunch Spear-grass (*Heteropogon contortus*) on red sand.	**Unlikely to occur.** Not previously recorded within the impact area and local surrounds. Limited very marginal habitat present within the impact area and surrounds.

Appendix D

Quaternary Vegetation Data and Findings

Key;
Introduced flora species
Native flora species
Dominant species in vegetation layer

Quaternary	Q1S					
Date:	12-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Alternanthera ficoidea	40	-		-		
Senna obtusifolia	20					
Paspalum dilatatum	10					
Ipomea sp.	1.5					
Malvastrum coromandelianum	1					
Macroptilium atropurpureum	0.5					
Chloris virgata	0.5					
Mesosphaerum suaveolens	0.5					
Physalis peruviana	0.1					
Senna hirsuta	0.1					

North

East

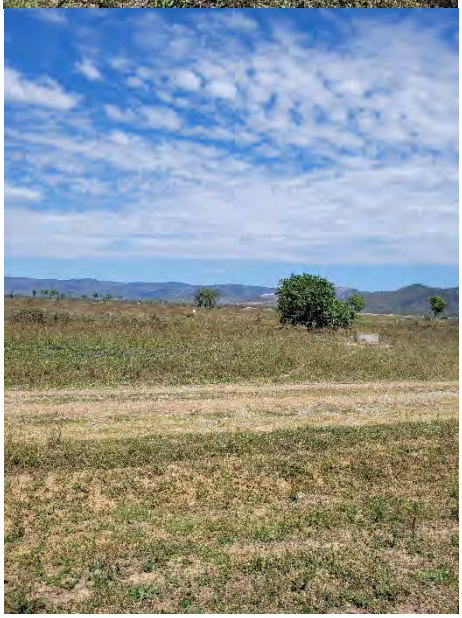
South

West

Quaternary	Q2S					
Date:	12-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Digitaria didactyla	30	*Ficus opposita*	3	-		
Alternanthera ficoidea	20					
Stylostanthes scabra	5					
Eleusine indica	3					
Ipomea sp.	1					
Senna obtusifolia	1					
Sida acuta	0.5					
Paspalum dilatatum	0.5					
Macroptilium atropurpureum	0.1					
Crotolaria sp.	0.1					
Lotononis bainesii	0.1					


North


East


South


West

Quaternary	Q3S					
Date:	12-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Alternanthera ficoidea	55	-		-		
Sida acuta	7					
Senna obtusifolia	0.1					
Ipomea sp.	0.5					

North

East

South

West

Quaternary	Q5S					
Date:	12-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	7	*Canthium attenuatum*	3	*Corymbia dallachiana*	9	90
Chloris virgata	5					
Eragrostis parviflora	3					
Malvastrum coromandelianum	1					

North

East

South

West

Quaternary	Q6S					
Date:	13-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Alternanthera ficoidea	35	-		-		
Paspalum dilatatum	35					
Malvastrum coromandelianum	7					
Senna obtusifolia	7					
Sida cordifolia	5					
Cucumis myriocarpus	2					
Crotolaria sp.	1					
Tridax procumbens	1					
Macroptilium atropurpureum	0.1					
Acanthospermum hispidum	0.1					
Chamaesyce hirta	0.1					

North

East

South

West

Quaternary	Q7S					
Date:	13-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Paspalum dilatatum	35			*Eucalyptus crebra*	17	22
Chloris virgata	30			*Acacia stenophylla*	17	20
Alternanthera ficoidea	15					
Chamaecrista rotundifolia	1					
Malvastrum coromandelianum	0.5					
Mesosphaerum suaveolens	0.5					

North

East

South

West

Quaternary	Q46S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Alternanthera ficoidea	50	-		-		
Heteropogon contortus	10					
Stylostanthes scabra	1					
Sida acuta	1					

North

East

South

West

Quaternary	Q47S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Cynodon dactylon var. dactylon	60	*Ziziphus mauritiana*	1.5	*Eucalyptus platyphylla*	9	200
Stylostanthes scabra	7					
Alternanthera ficoidea	1					
Paspalum dilatatum	1					
Sida cordifolia	0.1					

North

East

South

West

Quaternary	Q48S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	55	*Ziziphus mauritiana*	5	-		
Bothriochloa decipiens	1					
Heteropogon contortus	1					

North

East

South

West

Quaternary	Q49S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	45			*Eucalyptus platyphylla*	8	210
Heteropogon contortus	3			*Corymbia clarksonia*	9	220
Alternanthera ficoidea	2					
Sida cordifolia	1					
Paspalum dilatatum	0.1					
Sida hackettiana	0.1					

North

South

East

West

Quaternary	Q50S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	*Ziziphus mauritiana*	4	-		
Heteropogon contortus	5	*Cryptostegia grandiflora*	3			
Sida acuta	0.2					
Paspalum dilatatum	0.1					

North

East

South

West

Quaternary	Q51S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	40			*Corymbia dallachiana*	11	210
Alternanthera ficoidea	33					
Heteropogon contortus	0.1					
Sida hackettiana	0.1					
Sida acuta	0.1					

North

East

South

West

Quaternary	Q52S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	40			*Corymbia dallachiana*	13	210
Heteropogon contortus	12			*Eucalyptus platyphylla*	10	200
Themeda avenacea	5			*Melaleuca viridiflora*	10	110
Eragrostis spartinoides	0.1					


North


East


South


West

Quaternary	Q53S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	65			*Corymbia clarksonia*	10	400
Alternanthera ficoidea	0.5					
Heteropogon contortus	0.2					

North

East

South

West

Quaternary	Q54S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	55			*Eucalyptus crebra*	11	200
Alternanthera ficoidea	3					
Heteropogon contortus	2					
Sida acuta	0.2					
Sida hackettiana	0.2					

North

East

South

West

Quaternary	Q55S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Heteropogon contortus	10	-		-		
Aristida queenslandica	7					
Chamaecrista rotundifolia	5					
Stylostanthes scabra	4					
Paspalum dilatatum	3					

North

East

South

West

Quaternary	Q56S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Bothriochloa decipiens	5	-		-		
Heteropogon contortus	5					
Stylostanthes scabra	4					
Eragrostis spartinoides	3					
Sida acuta	0.2					
Eriochloa sp.	0.1					
Lotononis bainesii	0.1					
Paspalum conjugatum	0.1					

North

East

South

West

Quaternary	Q57S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	30	-		-		
Alternanthera ficoidea	0.2					
Bothriochloa decipiens	0.1					
Heteropogon contortus	0.1					

North

East

South

West

Quaternary	Q58S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	30	*Ziziphus mauritiana*	4	-		
Paspalum dilatatum	10					
Bothriochloa decipiens	7					
Sida acuta	0.5					
Alternanthera ficoidea	0.1					
Heteropogon contortus	0.1					
Paspalum conjugatum	0.1					

North

South

East

West

Quaternary	Q59S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Bothriochloa decipiens	40	-		-		
Chloris virgata	10					
Stylostanthes scabra	0.5					
Sida acuta	0.1					

North

East

South

West

Quaternary	Q60S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Chloris virgata	30	-		-		
Stylostanthes scabra	7					
Eleusine indica	1					
Eragrostis elongata	0.1					
Ocimum basilicum	0.1					

North

East

South

West

Quaternary	Q61S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	40			*Melaleuca viridiflora*	7	110
Paspalum dilatatum	10					
Chamaecrista rotundifolia	3					
Alternanthera ficoidea	2					
Sida acuta	0.1					

North

East

South

West

Quaternary	Q62S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	45			*Eucalyptus platyphylla*	8	110
Heteropogon contortus	0.5					
Paspalum dilatatum	0.1					

North

South

East

West

Quaternary	Q63S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	50			*Corymbia tessellaris*	9	120
Paspalum dilatatum	2					
Richardia stellaris	0.1					
Sida acuta	0.1					

North

East

South

West

Quaternary	Q64S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Paspalum dilatatum	5	*Ziziphus mauritiana*	1.5	-		
Stylostanthes scabra	3					
Alternanthera ficoidea	0.1					
Eleusine indica	0.1					
Sida acuta	0.1					

Quaternary	Q65S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	22	-		-		
Paspalum dilatatum	20					
Alternanthera ficoidea	2					
Digitaria didactyla	0.1					
Eriochloa sp.	0.1					
Sida acuta	0.1					

North

East

South

West

Quaternary	Q66S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	37	-		-		
Bothriochloa decipiens	0.2					
Paspalum dilatatum	0.2					
Alternanthera ficoidea	0.1					
Sida acuta	0.1					
Sida cordifolia	0.1					

North

East

South

West

Quaternary	Q67S					
Date:	15-09-2022					
Assessors:	ZL & AH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Chloris virgata	30	-		-		
Alternanthera ficoidea	2.5					
Stylostanthes scabra	2.5					
Panicum laevinode	1					
Sida acuta	1					
Paspalum dilatatum	0.2					

North

East

South

West

Quaternary	QD					
Date:	10-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Alternanthera ficoidea	20	-		*Acacia stenophylla*	22	230
Sida acuta	5					
Senna obtusifolia	4					
Chamaecrista rotundifolia	3					
Paspalum dilatatum	3					
Chloris gayana	1					
Malvastrum coromandelianum	1					
Ocimum basilicum var. thyrsiflora	0.5					
Digitaria didactyla	0.1					

North

East

South

West

Quaternary	QAM					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	30	*Ziziphus mauritiana*	2	*Corymbia dallachiana*	14	*100*
Chloris gayana	25					
Alternanthera ficoidea	0.1					

North

East

South

West

Quaternary	QAN					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	***Cryptostegia grandiflora***	3	*Corymbia dallachiana*	14	100
Panicum decompositum	1.5	*Ziziphus mauritiana*	3.5			

North

East

South

West

Quaternary	QAO					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	***Ziziphus mauritiana***	3	-		
Chloris gayana	10	*Cryptostegia grandiflora*	2			
Paspalum dilatatum	0.1	*Atalaya hemiglauca*	3			
Sida cordifolia	0.1					
Alternanthera ficoidea	0.1					

North

East

South

West

Quaternary	QAP					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	50	***Ziziphus mauritiana***	3	*Corymbia dallachiana*	18	200
Chloris gayana	45	*Cryptostegia grandiflora*	2			
Alternanthera ficoidea	1					

North

East

South

West

Quaternary	QAQ					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	55	Ziziphus mauritiana	2	-		
Chloris gayana	18					
Alternanthera ficoidea	2					

North

East

South

West

Quaternary	QAR					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; goats					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	*Ziziphus mauritiana*	2.5	*Corymbia dallachiana*	5	100
Chloris gayana	30	*Cryptostegia grandiflora*	1			
Alternanthera ficoidea	2.5	*Canthium attenuatum*	2.5			

North

East

South

West

Quaternary	QAS					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	***Ziziphus mauritiana***	2.2	*Corymbia dallachiana*	17.5	200
Chloris gayana	30	*Cryptostegia grandiflora*	2	*Acacia stenophylla*	17.5	
Alternanthera ficoidea	7					

North

East

South

West

Quaternary	QAT					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Chloris gayana	30	***Cryptostegia grandiflora***	2	*Corymbia dallachiana*	14	190
Stylostanthes scabra	25	***Ziziphus mauritiana***	4			
Alternanthera ficoidea	10	*Melaleuca nervosa*				

North

East

South

West

Quaternary	QAU					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	65	***Cryptostegia grandiflora***	2	*Eucalyptus platyphylla*	12	90
Chloris gayana	10	*Ziziphus mauritiana*	2	***Corymbia dallachiana***	15	200

North

East

South

West

Quaternary	QAV					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	65	***Cryptostegia grandiflora***	2	*Eucalyptus platyphylla*	14	200
Chloris gayana	15	*Ziziphus mauritiana*	2.5			

North

East

South

West

Quaternary	QAW					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	50	***Ziziphus mauritiana***	2	*Corymbia dallachiana*	11	100
Chloris gayana	35	*Acacia salicina*	1.5			
Alternanthera ficoidea	7					

North

East

South

West

Quaternary	QAX					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	***Ziziphus mauritiana***	2.5	*Corymbia dallachiana*	17	200
Sida hackettiana	1	*Cryptostegia grandiflora*	2.5			

North

East

South

West

Quaternary	QAY					
Date:	14-10-2022					
Assessors:	ZL & RH					
Disturbances	Livestock grazing; cattle					
Ground layer		**Shrub layer**		**Canopy layer**		
Species	**% Cover**	**Species**	**Median Height (m)**	**Species**	**Median Height (m)**	**Max DBH (mm)**
Stylostanthes scabra	60	***Ziziphus mauritiana***	4	***Eucalyptus crebra***	21	200
Alternanthera ficoidea	1.5	*Cryptostegia grandiflora*	2	*Corymbia dallachiana*	19	160
Chloris gayana	1					

North

East

South

West

Appendix E

Biocondition Vegetation Survey Data and Findings

BioCondition Assessment		
Date: 12/09/2022	**Assessor:** ZL & AH	**Site No:** BIO 01

Mapped RE: 11.3.30
Verified RE: 11.3.35
Benchmark Available?: Yes

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	18	15
	Sub-canopy height	3	6
	Number of large eucalypt trees (Threshold: cm/dbh)	0	20
	Number of large eucalypt trees (Threshold: cm/dbh)	0	12
	Native tree species richness	2	6
	Tree species:	*Corymbia clarksonia*	
	Non-native cover	39	0
50 x 10 m area	Native shrub species richness	0	4
	Native grass species richness	1	7
	Native forb and other species richness	0	12
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	15	30
	Sub-canopy cover	0	15
	Shrub cover	0	5
	Average perennial grass cover	0.2	52
	Average organic litter cover	31.8	15
	Total coarse woody debris (m/ ha):	0	319

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	4
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	3		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	2.5
	Tree species richness	2.5		
	Shrub species richness	0		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	2.5
	Emergent cover	NA		
	Canopy cover	5		
	Subcanopy cover	0		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	3
	(j) Coarse woody debris		5	0

BioCondition Assessment		
Date: 12-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 02
Mapped RE: 11.3.30 **Verified RE:** 11.3.35		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	16	15
	Sub-canopy height	3.5	6
	Number of large eucalypt trees (Threshold: 41cm/dbh)	0	20
	Number of large eucalypt trees (Threshold: 26cm/dbh)	2	12
	Native tree species richness	2	6
	Tree species:	*Corymbia tesselaris, Melaleuca viridiflora.*	
	Non-native cover	40.6	0
50 x 10 m area	Native shrub species richness	1	4
	Native grass species richness	1	7
	Native forb and other species richness	0	12
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	12	30
	Sub-canopy cover	0	15
	Shrub cover	0	5
	Average perennial grass cover	0.2	52
	Average organic litter cover	13	15
	Total coarse woody debris (m/ ha):	47	319

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	4
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	3		
	(c) Large trees		15	5
	(d) Native plant species richness		20 (4 x 5)	5
	Tree species richness	2.5		
	Shrub species richness	2.5		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	1
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	0		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	2

BioCondition Assessment		
Date: 12-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 03

Mapped RE: 11.3.30
Verified RE: 11.3.30
Benchmark Available?: Yes

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	14	14
	Sub-canopy height	NA	NA
	Number of large eucalypt trees (Threshold: cm/dbh)	2	12
	Number of large eucalypt trees (Threshold: cm/dbh)	NA	NA
	Native tree species richness	7	4
	Tree species:	*Atalaya hemiglauca, Corymbia clarksonia, Eucalyptus crebra, Grevillia parallela, Melaleuca viridiflora, Eremophila michelli, Acacia stenophyla*	
	Non-native cover	29.8	0
50 x 10 m area	Native shrub species richness	0	2
	Native grass species richness	0	9
	Native forb and other species richness	1	11
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	10	24
	Sub-canopy cover	NA	NA
	Shrub cover	0	1
	Average perennial grass cover	0	41
	Average organic litter cover	38.6	41
	Total coarse woody debris (m/ ha):	0	257

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	14		
	Subcanopy height	NA		
	(c) Large trees		15	5
	(d) Native plant species richness		20 (4 x 5)	5
	Tree species richness	5		
	Shrub species richness	0		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	2
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	NA		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	257

BioCondition Assessment		
Date: 12-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 04
Mapped RE: 11.3.30 **Verified RE:** 11.3.30		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	14	14
	Sub-canopy height	NA	NA
	Number of large eucalypt trees (Threshold: cm/dbh)	0	12
	Number of large eucalypt trees (Threshold: cm/dbh)	NA	NA
	Native tree species richness	5	4
	Tree species:	*Corymbia clarksonia, Eucalyptus crebra, Corymbia dallachiana, Eremophila mitchellii, Atalaya hemiglauca*	
	Non-native cover	42	0
50 x 10 m area	Native shrub species richness	0	2
	Native grass species richness	0	9
	Native forb and other species richness	1	11
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	10.7	24
	Sub-canopy cover	NA	NA
	Shrub cover	3.5	1
	Average perennial grass cover	0	41
	Average organic litter cover	46.6	41
	Total coarse woody debris (m/ ha):	0	257

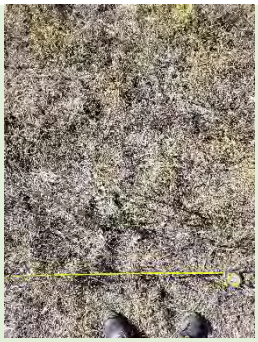
North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	NA		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	5
	Tree species richness	5		
	Shrub species richness	0		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	2
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	NA		
	(g) Shrub layer cover		5	3
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	0

BioCondition Assessment		
Date: 13-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 05
Mapped RE: 11.3.35 **Verified RE:** 11.3.35		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	14	15
	Sub-canopy height	5	6
	Number of large eucalypt trees (Threshold: cm/dbh)	0	20
	Number of large eucalypt trees (Threshold: cm/dbh)	0	12
	Native tree species richness	3	6
	Tree species:	*Lophostemon grandifloras, Eucalyptus platyphylla, Melaleuca leucadendra.*	
	Non-native cover	61	0
50 x 10 m area	Native shrub species richness	1	4
	Native grass species richness	0	7
	Native forb and other species richness	0	12
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	4	30
	Sub-canopy cover	0	15
	Shrub cover	0	5
	Average perennial grass cover	0	52
	Average organic litter cover	0.6	15
	Total coarse woody debris (m/ ha):	0	319

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	5		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	5
	Tree species richness	2.5		
	Shrub species richness	2.5		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	0
	(f) Tree canopy cover		5	1
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	0		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	0
	(j) Coarse woody debris		5	0

BioCondition Assessment		
Date: 13-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 06
Mapped RE: 11.3.35 **Verified RE:** 11.3.35		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	15	15
	Sub-canopy height	5	6
	Number of large eucalypt trees (Threshold: 41cm/dbh)	4	20
	Number of large eucalypt trees (Threshold: 26cm/dbh)	2	12
	Native tree species richness	3	6
	Tree species:	*Melaleuca leucadendra, Lophotemon grandifloras, Lysiphyllum hookeri*	
	Non-native cover	69.4	0
50 x 10 m area	Native shrub species richness	0	4
	Native grass species richness	0	7
	Native forb and other species richness	0	12
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	4	30
	Sub-canopy cover	0	15
	Shrub cover	0	5
	Average perennial grass cover	0	52
	Average organic litter cover	16.4	15
	Total coarse woody debris (m/ ha):	75	319

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	5		
	(c) Large trees		15	5
	(d) Native plant species richness		20 (4 x 5)	2.5
	Tree species richness	2.5		
	Shrub species richness	0		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	0
	(f) Tree canopy cover		5	1
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	0		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	2

BioCondition Assessment		
Date: 13-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 07
Mapped RE: 11.3.30 **Verified RE:** 11.3.35		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	12	15
	Sub-canopy height	4	6
	Number of large eucalypt trees (Threshold: cm/dbh)	0	20
	Number of large eucalypt trees (Threshold: cm/dbh)	0	12
	Native tree species richness	5	6
	Tree species:	*Corymbia clarsonia, Atalaya hemiglauca, Melaleuca viridiflora, Eremophila mitchellii, Corymbia tessilaris*	
	Non-native cover	36.2	0
50 x 10 m area	Native shrub species richness	1	4
	Native grass species richness	0	7
	Native forb and other species richness	0	12
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	6	30
	Sub-canopy cover	6	15
	Shrub cover	2	5
	Average perennial grass cover	0	52
	Average organic litter cover	42.6	15
	Total coarse woody debris (m/ ha):	53	319

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	4
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	3		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	5
	Tree species richness	2.5		
	Shrub species richness	2.5		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	2
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	2		
	(g) Shrub layer cover		5	3
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	3
	(j) Coarse woody debris		5	2

BioCondition Assessment		
Date: 13-09-2022	**Assessor:** ZL & AH	**Site No:** BIO 08
Mapped RE: 11.3.30 **Verified RE:** 11.3.30		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	16	14
	Sub-canopy height	NA	NA
	Number of large eucalypt trees (Threshold: 41 cm/dbh)	0	12
	Number of large eucalypt trees (Threshold: NA cm/dbh)	NA	NA
	Native tree species richness	2	4
	Tree species:	*Eucalyptus crebra*	
	Non-native cover	41	0
50 x 10 m area	Native shrub species richness	0	2
	Native grass species richness	0	9
	Native forb and other species richness	1	11
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	12.5	24
	Sub-canopy cover	NA	NA
	Shrub cover	0	1
	Average perennial grass cover	4	41
	Average organic litter cover	44.2	41
	Total coarse woody debris (m/ ha):	40	257

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	NA		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	2.5
	Tree species richness	2.5		
	Shrub species richness	0		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	5
	Emergent cover	NA		
	Canopy cover	5		
	Subcanopy cover	NA		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	2

BioCondition Assessment		
Date: 10-10-2022	**Assessor:** ZL & RH	**Site No:** BIO A
Mapped RE: 11.3.30 **Verified RE:** 11.3.35		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	16	15
	Sub-canopy height	7	6
	Number of large eucalypt trees (Threshold: 41cm/dbh)	18	20
	Number of large eucalypt trees (Threshold: 26cm/dbh)	12	12
	Native tree species richness	5	6
	Tree species:	*Corymbia tesselaris, Corymbia clarksonia, Melaleuca viridiflora, Melaleuca leucadendra, Planchonia careya*	
	Non-native cover	25.3	0
50 x 10 m area	Native shrub species richness	3	4
	Native grass species richness	1	7
	Native forb and other species richness	5	12
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	37.6	30
	Sub-canopy cover	14.9	15
	Shrub cover	0	5
	Average perennial grass cover	0	52
	Average organic litter cover	53.2	15
	Total coarse woody debris (m/ ha):	33	319

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	5		
	(c) Large trees		15	10
	(d) Native plant species richness		20 (4 x 5)	7.5
	Tree species richness	2.5		
	Shrub species richness	2.5		
	Grass species richness	0		
	Forb species richness	2.5		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	5
	Emergent cover	NA		
	Canopy cover	5		
	Subcanopy cover	5		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	3
	(j) Coarse woody debris		5	2

BioCondition Assessment		
Date: 10-10-2022	**Assessor:** ZL & RH	**Site No:** BIO B
Mapped RE: 11.3.30 **Verified RE:** 11.3.30		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	16	14
	Sub-canopy height	NA	NA
	Number of large eucalypt trees (Threshold: 41cm/dbh)	0	12
	Number of large eucalypt trees (Threshold: NA)	NA	NA
	Native tree species richness	3	4
	Tree species:	*Corymbia dallachiana, Corymbia tesselaris, Melaleuca salicina*	
	Non-native cover	45	0
50 x 10 m area	Native shrub species richness	1	2
	Native grass species richness	3	9
	Native forb and other species richness	1	11
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	0	24
	Sub-canopy cover	NA	NA
	Shrub cover	0	1
	Average perennial grass cover	0.4	41
	Average organic litter cover	45.3	41
	Total coarse woody debris (m/ ha):	0	257

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	NA		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	7.5
	Tree species richness	2.5		
	Shrub species richness	2.5		
	Grass species richness	2.5		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	0
	Emergent cover	NA		
	Canopy cover	0		
	Subcanopy cover	NA		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	0

BioCondition Assessment		
Date: 10-10-2022	**Assessor:** ZL & RH	**Site No:** BIO C
Mapped RE: 11.3.30 **Verified RE:** 11.3.30		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	11	14
	Sub-canopy height	NA	NA
	Number of large eucalypt trees (Threshold: cm/dbh)	0	12
	Number of large eucalypt trees (Threshold: cm/dbh)	NA	NA
	Native tree species richness	4	4
	Tree species:	*Corymbia dallachiana, Melaleuca viridiflora, Atalaya hemiglauca, Melaleuca salicina*	
	Non-native cover	21.2	0
50 x 10 m area	Native shrub species richness	1	2
	Native grass species richness	2	9
	Native forb and other species richness	0	11
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	18.1	24
	Sub-canopy cover	NA	NA
	Shrub cover	0	1
	Average perennial grass cover	0.5	41
	Average organic litter cover	52.2	41
	Total coarse woody debris (m/ ha):	0	257

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	0		
	Subcanopy height	NA		
	(c) Large trees		15	0
	(d) Native plant species richness		20 (4 x 5)	7.5
	Tree species richness	5		
	Shrub species richness	2.5		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	5
	(f) Tree canopy cover		5	5
	Emergent cover	NA		
	Canopy cover	5		
	Subcanopy cover	NA		
	(g) Shrub layer cover		5	0
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	0

BioCondition Assessment		
Date: 13-10-2022	**Assessor:** ZL & RH	**Site No:** BIO D
Mapped RE: 11.3.30 **Verified RE:** 11.3.30		
Benchmark Available?: Yes		

		Measured	Benchmark
100 x 50 m area (0.5 ha)	Recruitment:	0	100
	Emergent height:	NA	NA
	Canopy height	14	14
	Sub-canopy height	NA	NA
	Number of large eucalypt trees (Threshold: 41cm/dbh)	2	12
	Number of large eucalypt trees (Threshold: NA)	NA	NA
	Native tree species richness	4	4
	Tree species:	*Eucalyptus crebra, Corymbia dallachiana, Atalaya hemiglauca, Eremophila mitchellii*	
	Non-native cover	30.6	0
50 x 10 m area	Native shrub species richness	1	2
	Native grass species richness	1	9
	Native forb and other species richness	0	11
Plot Attributes (actual)	Emergent cover	NA	NA
	Canopy cover	3	24
	Sub-canopy cover	NA	NA
	Shrub cover	0.7	1
	Average perennial grass cover	0	41
	Average organic litter cover	56.8	41
	Total coarse woody debris (m/ ha):	6	257

North

East

South

West

Spot Photos





	Attribute Scoring		Weighting	Patch score
Site -based attributes	(a) Recruitment		5	0
	(b) Tree canopy height		5	5
	Emergent height	NA		
	Canopy height	5		
	Subcanopy height	NA		
	(c) Large trees		15	5
	(d) Native plant species richness		20 (4 x 5)	7.5
	Tree species richness	5		
	Shrub species richness	2.5		
	Grass species richness	0		
	Forb species richness	0		
	(e) Non-native plant cover		10	3
	(f) Tree canopy cover		5	2
	Emergent cover	NA		
	Canopy cover	2		
	Subcanopy cover	NA		
	(g) Shrub layer cover		5	5
	(h) Native perennial grass cover		5	0
	(i) Litter cover		5	5
	(j) Coarse woody debris		5	0

Appendix F

Fauna Likelihood of Occurrence Assessment

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
Amphibia	Microhylidae	*Cophixalus mcdonaldi*	Mt Elliot Nursery-frog	CE	CE	Resides in subtropical or tropical moist lowland forests. Eggs laid in a small cluster under leaf litter and logs and guarded by the male. Tadpoles do not swim in water, rather they hatch from the egg as small frogs. Found in a small area called Bowling Green Bay National Park on Mt Elliott, south-east of Townsville in northern Queensland.	**Unlikely to occur.** No previous records within the locality. Species habitat (subtropical or tropical moist lowland forests) does not occur within the impact area.
Aves	Accipitridae	*Erythrotriorchis radiatus*	Red Goshawk	V	E	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest	**Unlikely to occur.** No previous records within the locality. Species habitat occurs within the impact area.
Aves	Apodidae	*Apus pacificus*	Fork-tailed swift	-	SL	The Fork-tailed Swift is almost exclusively aerial, flying from 1 m to at least 300 m above ground. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. Often occur over cliffs and beaches and also over islands and sometimes well out to sea. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-	**Unlikely to occur.** No previous records within the locality. Species habitat occurs within the impact area.

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines They often occur in areas of updraughts, especially around cliffs. They probably roost aerially, but are occasionally observed to land and have been recorded roosting in trees, using a bare exposed branch emergent above the foliage.	
Aves	Columbidae	*Geophaps scripta scripta*	Squatter Pigeon (southern)	V	V	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	**Known.** Three birds were incidentally recorded during the survey period. Previously recorded within the locality and habitat values occur within the proposed impact area.
Aves	Charadriidae	*Charadrius leschenaultii*	Greater Sand Plover	V	V	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs. Occasionally recorded on near-coastal saltworks and saltlakes, including marginal saltmarsh, and on brackish swamps. They seldom occur at shallow freshwater wetlands.	**Unlikely to occur.** No previous records within the locality. Limited marginal habitat (freshwater wetland) occurs adjacent to the proposed impact area.
Aves	Charadriidae	*Pluvialis fulva*	Pacific golden plover	-	SL	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around	**Unlikely to occur.** Not previously recorded within the locality and

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. Sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass. Other terrestrial habitats inhabited include short (or, occasionally, long) grass in paddocks, crops or airstrips, or ploughed or recently burnt areas, and they are very occasionally recorded well away from water	marginal habitat occurs within the proposed impact area.
Aves	Hirundinidae	*Hirundo rustica*	Barn Swallow	Migratory	SL	This species seek out open habitats of all types, including agricultural areas, and are commonly found in barns or other outbuildings. They will also build nests under bridges, the eaves of old houses, and boat docks, as well as in rock caves and even on slow-moving trains. While migrating, they tend to fly over open areas, often near water or along mountain ridges.	**Known.** This species was observed on site during field assessment.
Aves	Cuculidae	*Cuculus optatus*	Oriental cuckoo	Migratory	SL	Oriental Cuckoos are found in more humid habitats in wet eucalypt forests, river margins and near to mangroves.	**Likely to occur.** This species was observed within riparian vegetation in the locality in March 2021.

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						This species visits Australia, particularly northern Australia in the winter and breeds exclusively overseas.	Limited riparian vegetation is available within the road alignment.
Aves	Estrildidae	*Poephila cincta cincta*	Black-throated finch (white-rumped subspecies)	E	E	The Black-throated Finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by Eucalyptus, Corymbia and Melaleuca, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. It occurs at two general locations: in the Townsville region, where it is considered to be locally common at a few sites around Townsville and Charters Towers; and at scattered sites in central-eastern Queensland (between Aramac and Great Basalt Wall National Park). It has been absent from Brisbane and its surrounds since the 1930s.	**Likely to occur.** Multiple species records within thelocality. Species habitat values including essential habitat vales occur within the proposed impact are.
Aves	Falconidae	*Falco hypoleucos*	Grey falcon	V	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three	**Unlikely to occur.** No species records within the locality. Potential habitat is present within the proposed impact area and surrounds.

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						eggs are laid. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).	
Aves	Laridae	*Gelochelidon nilotica*	Gull-billed tern	-	SL	Inhabits shallow wetlands, including coastal or inland lakes, swamps and lagoons, as well as sheltered bays and estuaries, where it forages for insects and small fish.	**Unlikely to occur.** Species previously recorded within the locality however ideal habitat is not present within the subject area and surrounds.
Aves	Laridae	*Hydroprogne caspia*	Caspian tern	-	SL	Found mostly in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. Also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs Large numbers may shelter along the coast, behind coastal sand-dunes or coastal lakes during rough weather, and have been recorded inland after storms.	**Unlikely to occur.** Species previously recorded within the locality. Potential habitat is present within the locality but not the road alignment.
Aves	Monarchidae	*Monarcha melanopsis*	Black-faced monarch	Marine Migratory	SL	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll)	**Known.** Species recorded from incidental sightings.

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. The species also occurs in selectively logged and 20—30 years old regrowth rainforest, nearby open eucalypt forests, especially in gullies with a dense, shrubby understorey as well as in dry sclerophyll forests and woodlands, often with a patchy understorey. The species especially occurs in 'marginal' habitats during winter or during passage (migration) Other areas in which the Black-faced Monarch may be found include: gullies in mountain areas or coastal foothills softwood scrub dominated by Brigalow, coastal scrub dominated by Coast Banksia (Banksia integrifolia) and Southern Mahogany (*Eucalyptus botryiodes*), occasionally among mangroves and sometimes in suburban parks and gardens.	Species previously recorded within the locality and marginal potential habitat is present within the subject area.
Aves	Monarchidae	*Symposiachrus trivirgatus*	Spectacled monarch	-	SL	Prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves and other densely vegetated areas.	**Unlikely to occur.** Species previously recorded within the locality, however ideal habitat is limited within the project area.
Aves	Ploceidae	*Neochmia ruficauda ruficauda*	Star Finch (eastern)	E	E	The Star Finch (eastern) occurs mainly in grasslands and grassy woodlands that are located close to bodies of fresh water,	**Unlikely to occur.** Suitable grassland habitat is present within the project

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						including areas dominated by grasses where the native vegetation has been partially cleared. The species also occurs in cleared or suburban areas such as along roadsides and in towns	area, however no previous species records within the locality.
Aves	Rhipiduridae	*Rhipidura rufifrons*	Rufous fantail	-	SL	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts, usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, often with a shrubby or heath understorey. They are also recorded from parks and gardens when on passage. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of Paperbarks.	**Unlikely to occur.** Species previously recorded within the locality; however ideal habitat is not present within the project area.
Aves	Rostratulidae	*Rostratula australis*	Australian Painted Snipe	E	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges,	**Unlikely to occur.** Species not previously recorded within the locality and marginal potential habitat is present within the subject area.

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber	
Aves	Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CE Migratory	CE	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns.	**Unlikely to occur.** Species not previously recorded within the locality. Potential habitat (dams) are present within the immediate area but not the road alignment.
Aves	Scolopacidae	*Gallinago hardwickii*	Latham's snipe	-	SL	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies. However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity	**Unlikely to occur.** Species previously recorded within the locality; species habitat values are present within the immediate area but not the road alignment.

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
Aves	Scolopacidae	*Numenius madagascariensis*	Eastern Curlew	CE	E	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbors, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	**Unlikely to occur.** Species not previously recorded within the locality. Species habitat (coastal, saltmarsh or other saline or brackish waterway or wetland areas) does not occur within the impact area.
Aves	Threskiornithidae	*Plegadis falcinellus*	Glossy ibis	Migratory Marine	SL	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons.	**Unlikely to occur.** Species previously recorded within the locality; species habitat values are present within the immediate area but not the road alignment.
Aves	Tytonidae	*Tyto novaehollandiae kimberli*	Masked Owl (northern)	V	V	In northern Australia, the Masked Owl has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields.	**Unlikely to occur.** Species not recorded within the locality. Species habitat values do not occur within the proposed impact area.
Aves	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	V	V	Almost exclusively aerial. Most often recorded above wooded areas, including open forest and rainforest, also commonly occur over heathland.	**Unlikely to occur.** Species not previously recorded within the locality. Mostly aerial however potential habitat present

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
							within the proposed impact area.
Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	E	E	Open forest and woodland where food trees are present.	**Unlikely to occur.** Species not recorded within the locality, however species habitat values do occur within portions of the proposed impact area.
Mammalia	Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	E	-	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forests and woodlands, rainforests, sandy lowlands and beaches, shrubland, grassland and desert. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes.	**Unlikely to occur.** Species not recorded within the locality, and limited species habitat values occur within the proposed impact area.
Mammalia	Emballonuridae	*Saccolaimus saccolaimus nudicluniatus*	Bare-rumped Sheath-tailed Bat	V	E	The Bare-rumped sheathtail bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments. The Bare-rumped sheath-tail bat has been suggested to forage over habitat edges such as the edge of rainforest and in forest clearings.	**Likely to occur.** Species recorded within the locality by EMM 2021 surveys. Potential species habitat values occur within the proposed impact area, including potential roosting hollows within the road alignment.
Mammalia	Megadermatidae	*Macroderma gigas*	Ghost Bat	V	E	Ghost Bat roost in caves, old mine tunnels and in deep cracks in rocks. A preference is given to sites with a complex of shafts	**Unlikely to occur.** Species not recorded within the locality. No suitable

Class	Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status	Habitat	Likelihood of occurrence
						or cavities and several openings to the outside. They usually roost in colonies. Built environments may be used as feeding grounds	roosting habitat was located within the proposed impact area.
Reptillia	Scincidae	*Egernia rugosa*	Yakka skink	V	V	The Yakka Skink is known to occur in open dry sclerophyll forest, woodland and scrub. Commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. The species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation in cleared habitat, this species can persist where there are shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens. This species is not generally found in trees or rocky habitats	**Unlikely to occur.** No previous records of the species within the locality. Proposed impact area contains marginal habitat.